Coal Age

NOVEMBER, 1944

TECHNOLOGY DEPT.

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DETROIT

25 YEARS IN MINER THINKING

HELPS MAINTAIN *Constant Air Pressure!*

SUN MINE LUBRICANTS

Prevent Air Compressor Shutdowns Caused By Sticking Valves

Pneumatic tools are vital to production in almost every mine. Any interruption to the supply of compressed air to operate these tools means a serious lag in "getting out the coal." In the complete line of Sun Mine Lubricants there are specially developed oils for use in air compressors that have proved invaluable to many mines in overcoming compressor troubles. Here's an actual experience in a large Pennsylvania mine which illustrates the point . . .

Frequent shutdowns of their air compressors were necessary for cleaning sticky gum deposits from the unloader valves. A Sun Engineer was called in and after careful analysis of the varnish-like deposits, recommended changing to a Sun Mine Lubricant.

In over a year of use, this new lubricant has completely eliminated all "gum trouble." Valves are clean . . . piston rings run free . . . and the compressors are running at top efficiency.

A tremendous saving in production time has resulted because down-time for cleaning has been reduced to an all-time low. This means not only a relief from production delays but also a cut in manhours previously required for compressor maintenance.

Whatever your particular lubrication problem may be, a Sun Engineer will probably be able to help you with it . . . whether it involves loaders, cutters, compressors, cars, locomotives, conveyors, power equipment or breaker machinery. His experience is broad, his training is thorough . . . and the Sun line of lubricants is complete.

A letter or 'phone call will bring him promptly. In the meantime, ask us for a free copy of our new lubrication manual . . . "How To Get The Most Out of Lubricants." You'll find it useful and helpful. Write to . . .

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SUNOCO

SUN INDUSTRIAL PRODUCTS

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In war or peace
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FIRST IN RUBBER

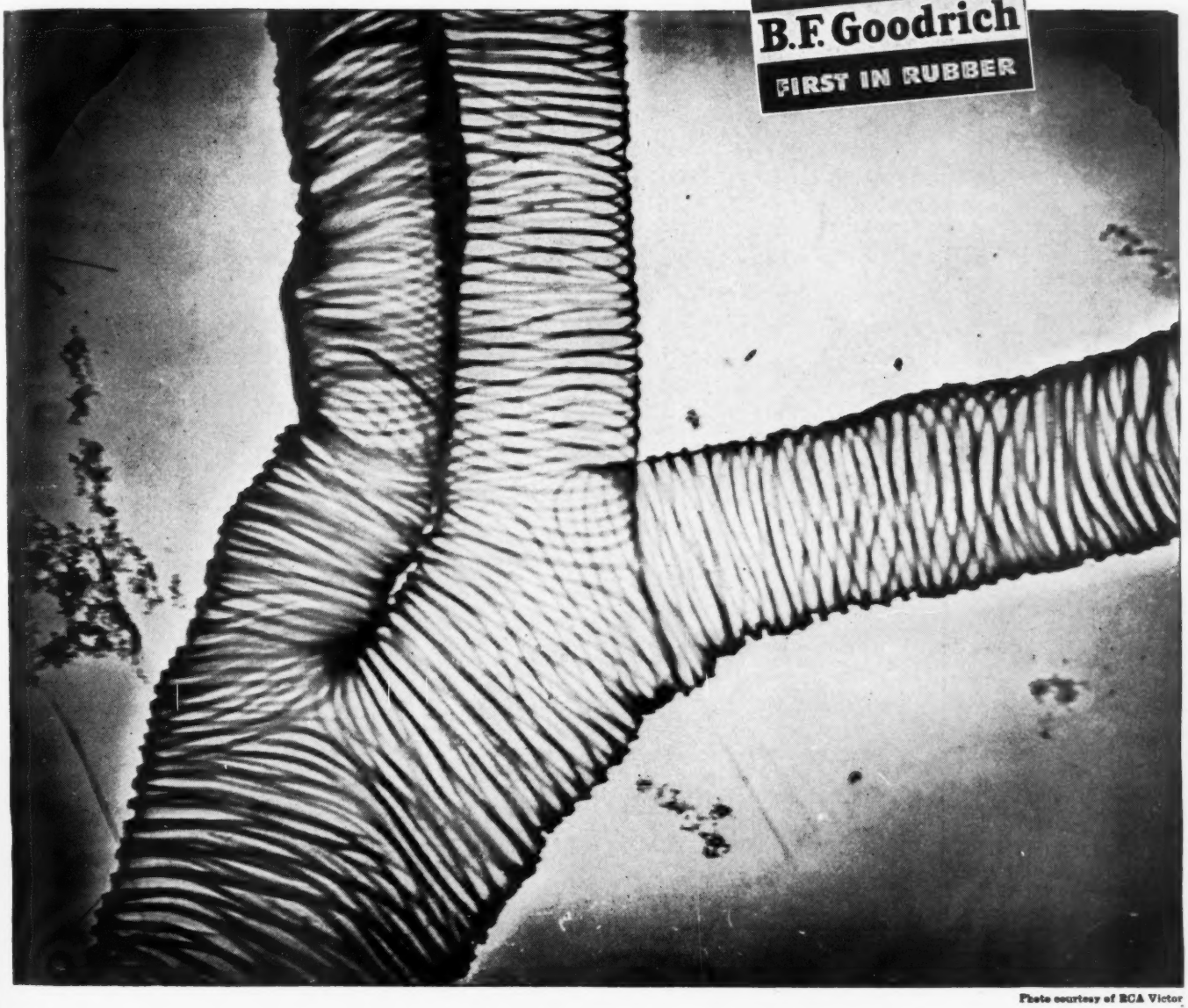

Photo courtesy of RCA Victor

Mosquito's windpipe

A typical example of B. F. Goodrich development in rubber

THAT picture was made possible by an electron microscope that can make ordinarily invisible objects look as much as *200,000 times their real size.* But more important than a picture of a mosquito's windpipe is the fact that scientists recently had their first look at a flu germ, thanks to this far-reaching scientific development. Almost daily, it brings to light new discoveries of great importance in the fields of medicine, industry and agriculture. But for months, the success of the electron miscroscope was threatened by the failure of a little sealing ring.

Because it operates by means of a vacuum, an absolutely air tight seal was needed for all the openings. Rubber was tried but couldn't stand the constant pressure or the oil that reached it from the vacuum pump. Leaks developed quickly. And sulphur in the rubber occasionally got into the instrument, upsetting its delicate workings. Results were always uncertain.

For two years scientists searched for a material that would meet the microscope's requirements. After many failures they learned of the oil-resisting B. F. Goodrich synthetic rubber used for bullet-sealing gasoline tanks, high-pressure hydraulic seals, and many other purposes. B. F. Goodrich developed a new compound of this material, containing no sulphur, that could stand the high pressures without weakening. Gaskets of this material were made and tested. They provided a perfect seal — and the microscope *stayed* sealed. No leaks, no breakdown. Today, these gaskets are standard equipment on production models of the instrument that gives promise of scientific advancement undreamed of a few short years ago. *The B. F. Goodrich Company, Industrial Products Division, Akron, Ohio.*

B.F. Goodrich

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To .....

SIGNED .....

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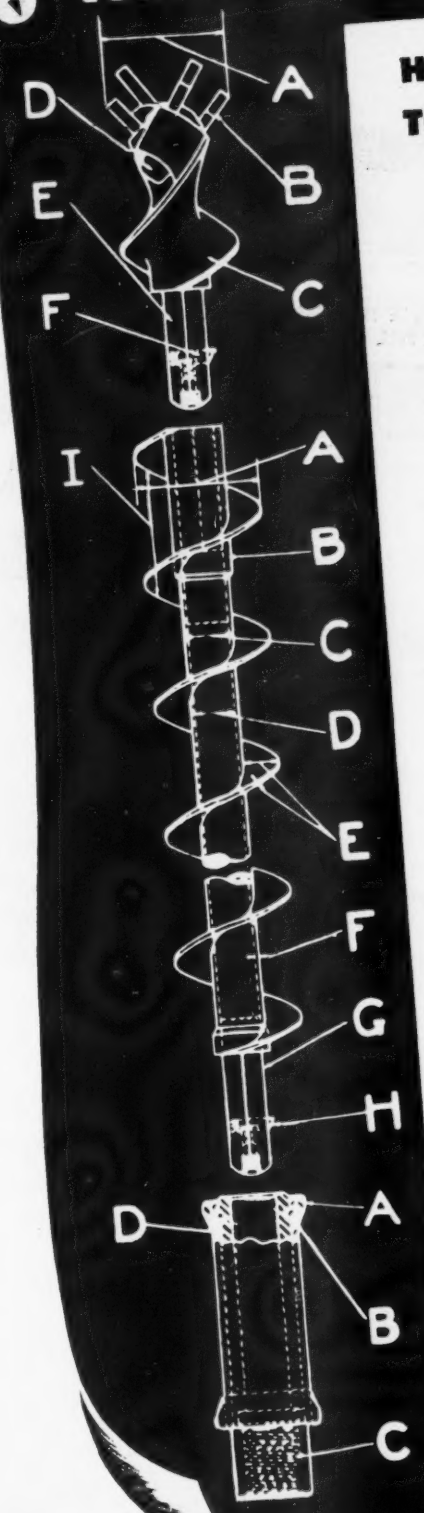
COALMASTER AUGER ASSEMBLY FEATURES



HERE'S WHY COALMASTER "MATCHED SET" TOOLS DRILL BETTER — FASTER — CHEAPER

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A. **DIAMETER OF HOLE.** Coalmaster Assemblies drill a wide range of hole sizes from 1⅝ to 16" in diameter for any type of operation in underground and strip mining.

B. **BITS.** Coalmaster special alloy steel bits are scientifically designed and heat-treated to give low bit cost in all classes of drilling.

C. **HEADS.** Coalmaster cast steel heads are heat-treated and hard-surfaced to give extra wear. Their special design and construction assures accurate drilling.

D. **WEDGE.** Coalmaster patented wedges assure tightly held bits and, as a result, true clean holes.

E. **HEAD SHANK.** The Coalmaster patented hexagon shank fits snugly into the socket and provides the most efficient and vibration-free coupling available.

F. **HEXANSPEED ASSEMBLY.** Coalmaster Hexanspeed Assembly is a simple, long-wearing, trouble-free mechanism which reduces auger changing time to a minimum and speeds up hole production ten to thirty per cent.

AUGERS

A. **AUGER DIAMETER.** The special welded-spiral construction of Coalmaster augers permits flexibility in auger construction to meet any specific requirements.

B. **SOCKET.** Patented Hexagon Coalmaster Sockets are broached to give a close coupling tolerance.

C. **OUTSIDE DIAMETER OF TUBE.** Coalmaster augers are constructed with special alloy steel tubes in varying diameters for holes from 1⅝" to 16".

D. **INSIDE DIAMETER OF TUBE.** Tubular construction combines rigidity and light weight in all Coalmaster augers.

E. **SPIRAL THICKNESS AND WIDTH.** The spiral widths and thicknesses of Coalmaster augers vary with the diameter of the auger and the size of the hole to be drilled.

F. **GAUGE OF TUBE.** Coalmaster augers are made with correct tube gauge to allow for the proper factor of safety in torque strength.

G. **AUGER SHANK.** Coalmaster shanks give that quick make-and-break coupling which is becoming standard with an increasingly large number of mines.

H. **HEXANSPEED ASSEMBLY.** The same efficient Hexanspeed Assembly is used on the auger shank as on the head shank. A simple tool uncouples the head or the auger. No fuss, no bother, no lost time in changing augers.

I. **PITCH.** Coalmaster augers are designed with the most effective pitches to provide scientific conveyance.

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A. **OUTSIDE SLEEVE.** For positive protection the safety sleeve permits the driller to handle the thread bar without danger to himself.

B. **BALL BEARING.** The ball bearings in the sleeve permit operation with minimum friction.

C. **THREADS.** Coalmaster Drill Sockets are threaded to fit thread bars of all leading Electric Drills.

D. **TUBE.** The tube is made of special alloy steel.

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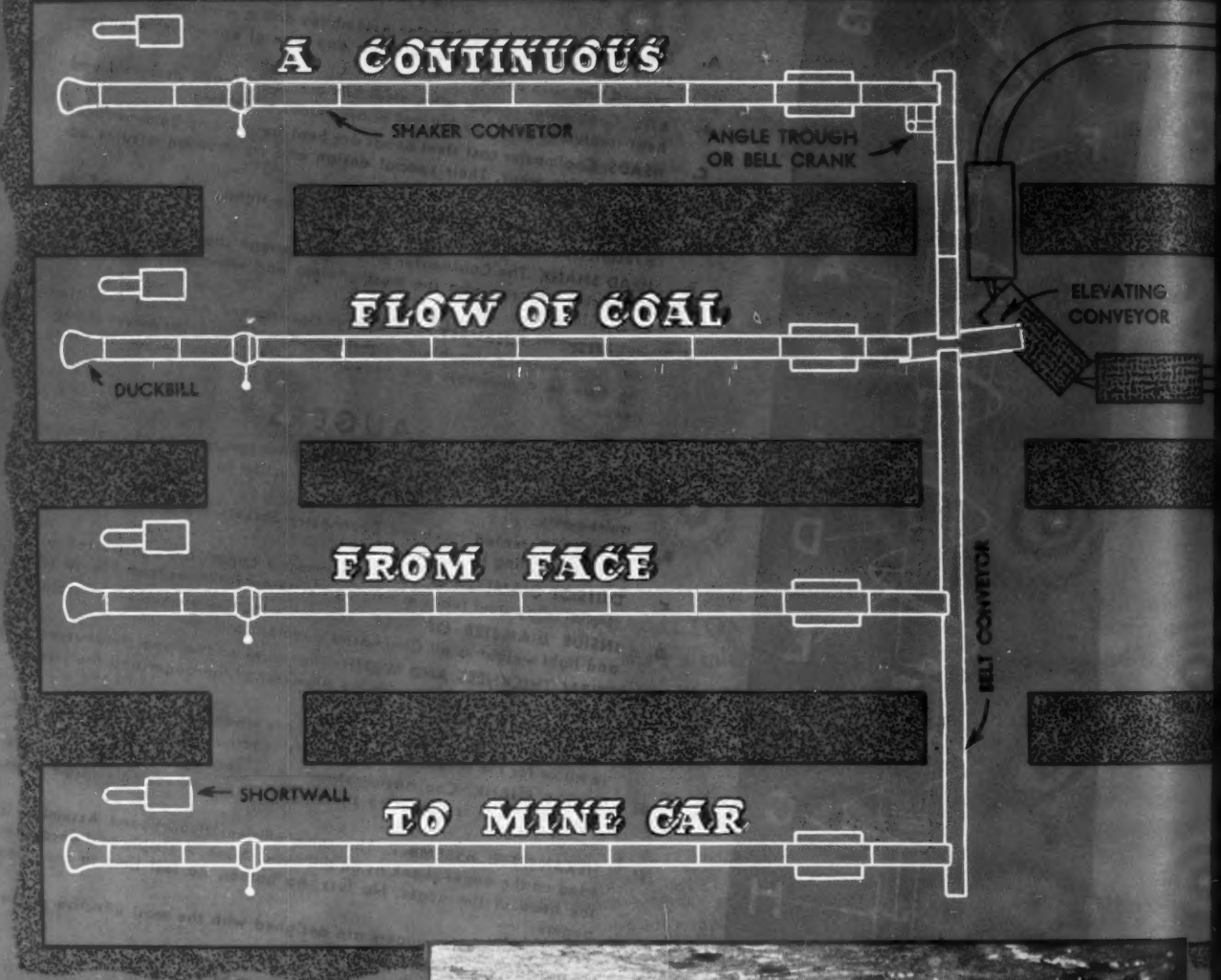


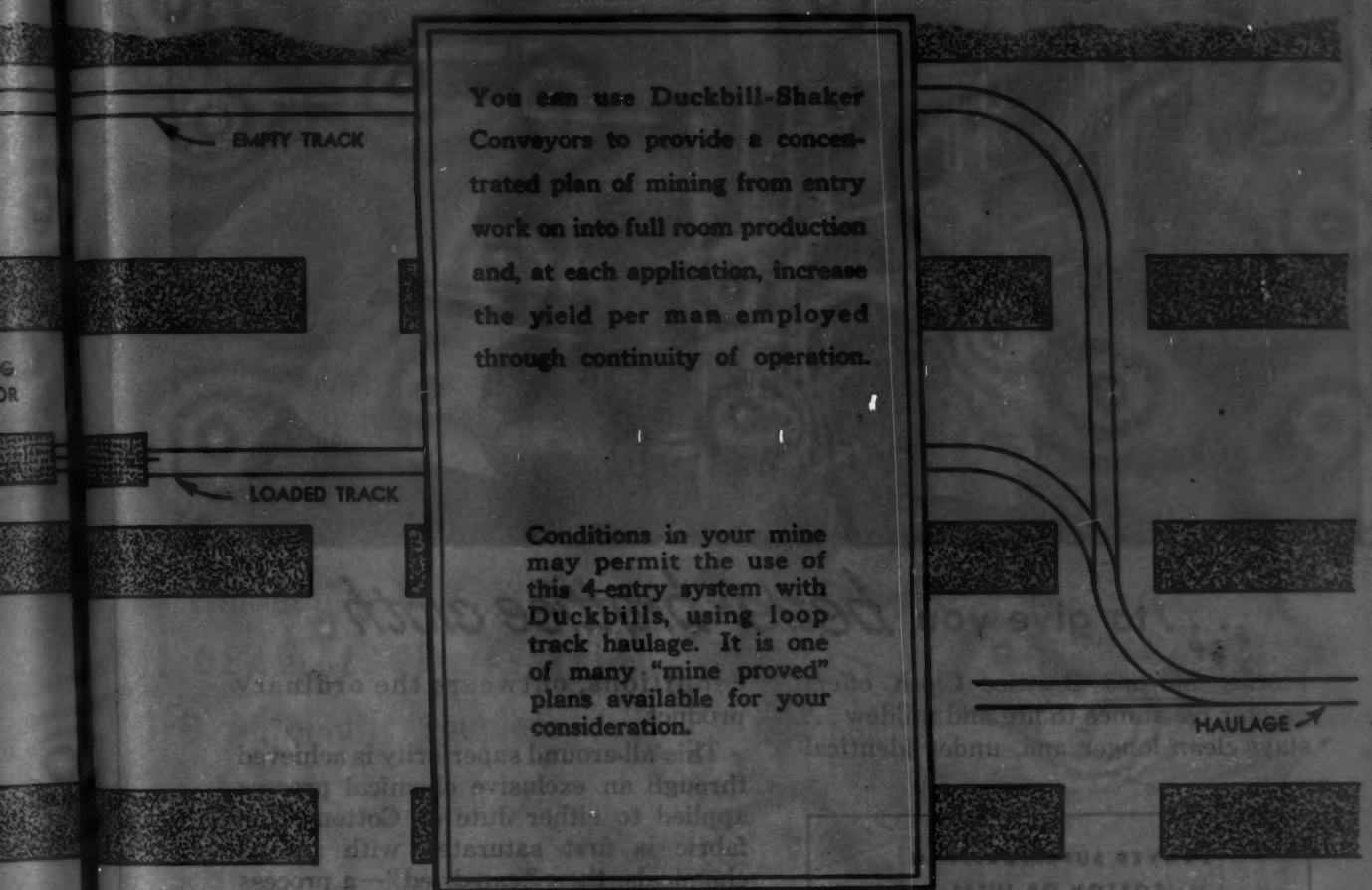
At the working face no time is lost waiting for preparation crews. Tramming and car change are not factors.

ARMY E NAVY

GOODMAN MANUFACTURING COMPANY

...Get Higher Tonnage per Man

DUCKBILL-SHAKER CONVEYORS



You can use Duckbill-Shaker Conveyors to provide a concentrated plan of mining from entry work on into full room production and, at each application, increase the yield per man employed through continuity of operation.

Conditions in your mine may permit the use of this 4-entry system with Duckbills, using loop track haulage. It is one of many "mine proved" plans available for your consideration.

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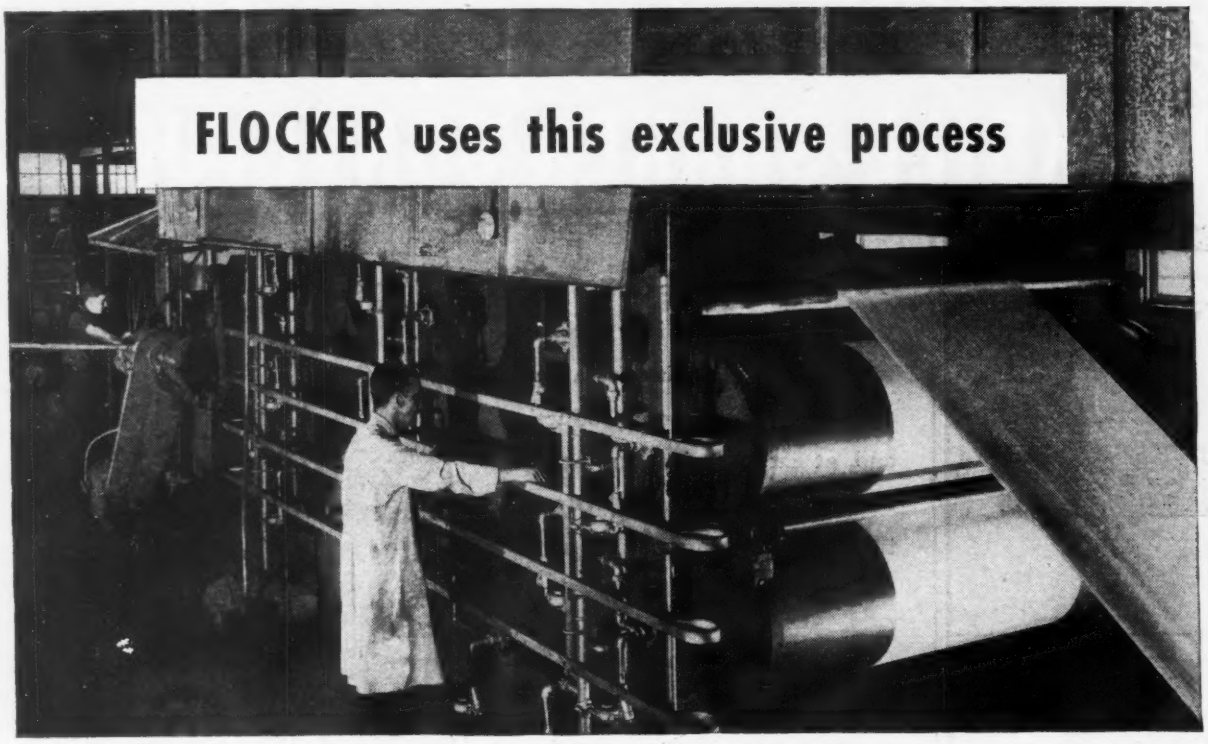

. . . to give you *better brattice cloth*

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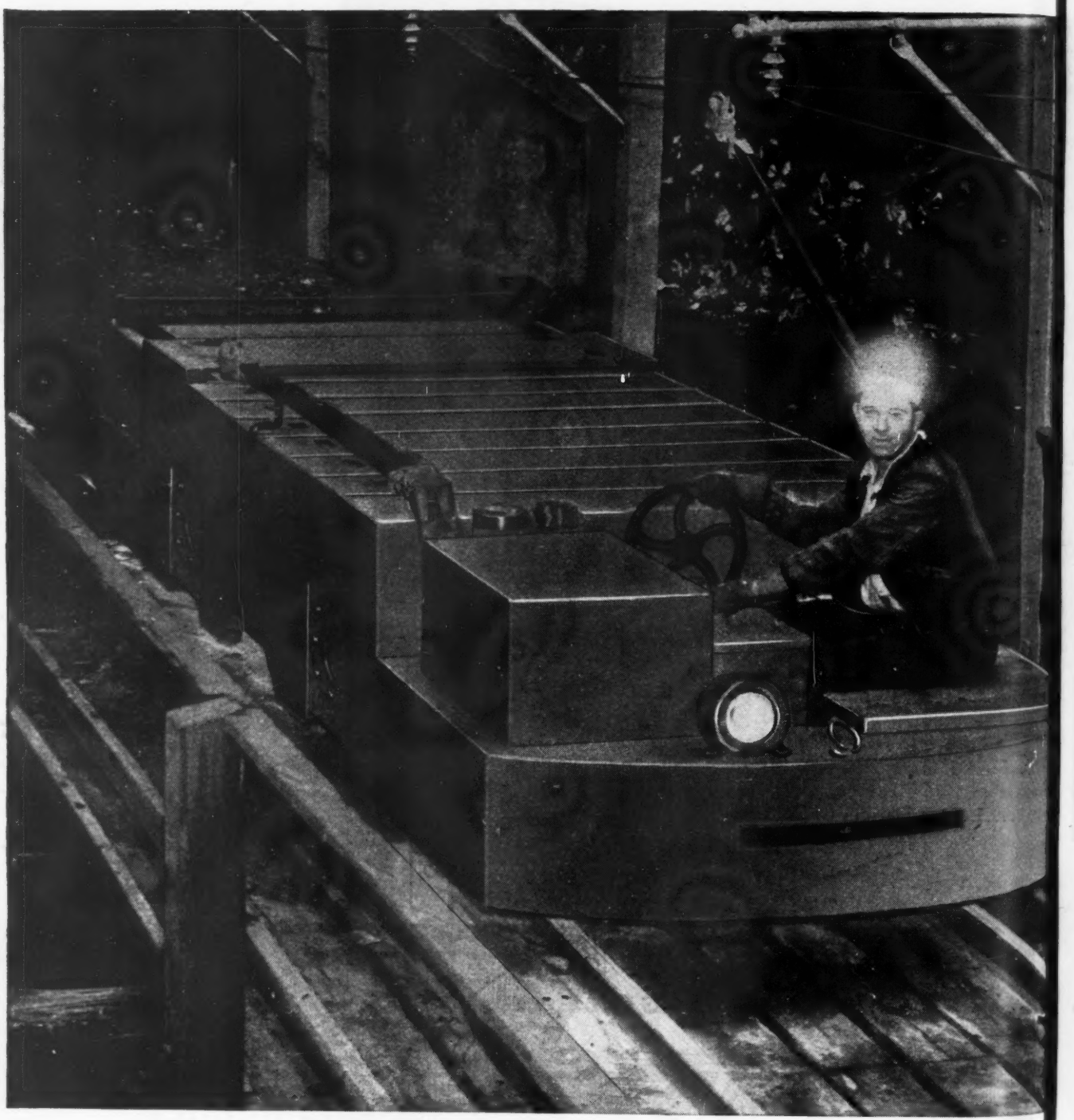

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REG. T.M.

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SURFACE *Express*

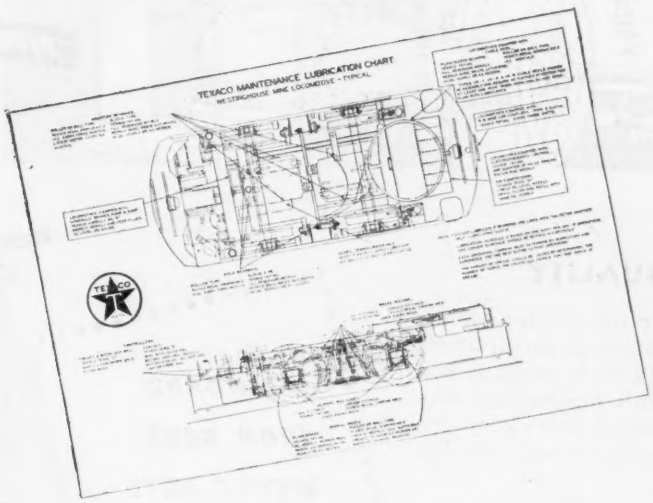
MINE locomotives must run on "express" schedules these days to meet the nation's unprecedented demand for coal. Other equipment, too, must run longer under heavier load . . . thus posing a serious maintenance problem for the industry.

Successful operators know that a big help in solving this problem is . . . *the right lubricant, in the right place, at the right time* . . . and so use Texaco Maintenance Lubrication Charts and Texaco lubricants.

Texaco Regal Starfak, for example, provides effective lubrication over a wide range of temperature conditions for grease-lubricated ball and roller bearings of electric locomotives. *Regal Starfak* resists separation, leakage, oxidation, therefore, makes bearings last longer.

Texaco lubricants are approved by all leading makers of coal mining equipment, who have cooperated with us in producing Texaco Maintenance Lubrication Charts.

Texaco Lubrication Engineering Service is available to you through more than 2300 Texaco distributing points in the 48 States. The Texas Company, *National Sales Division, Dept. C,* 135 East 42nd Street, New York 17, N. Y.



FREE! Texaco Maintenance Lubrication Charts show clearly not only *where* to use Texaco, but *when* and *with what* lubricant to service each lubrication point with products approved by manufacturers of all leading makes of cutters, loaders, locomotives, etc. Order the Charts you need by make and model.

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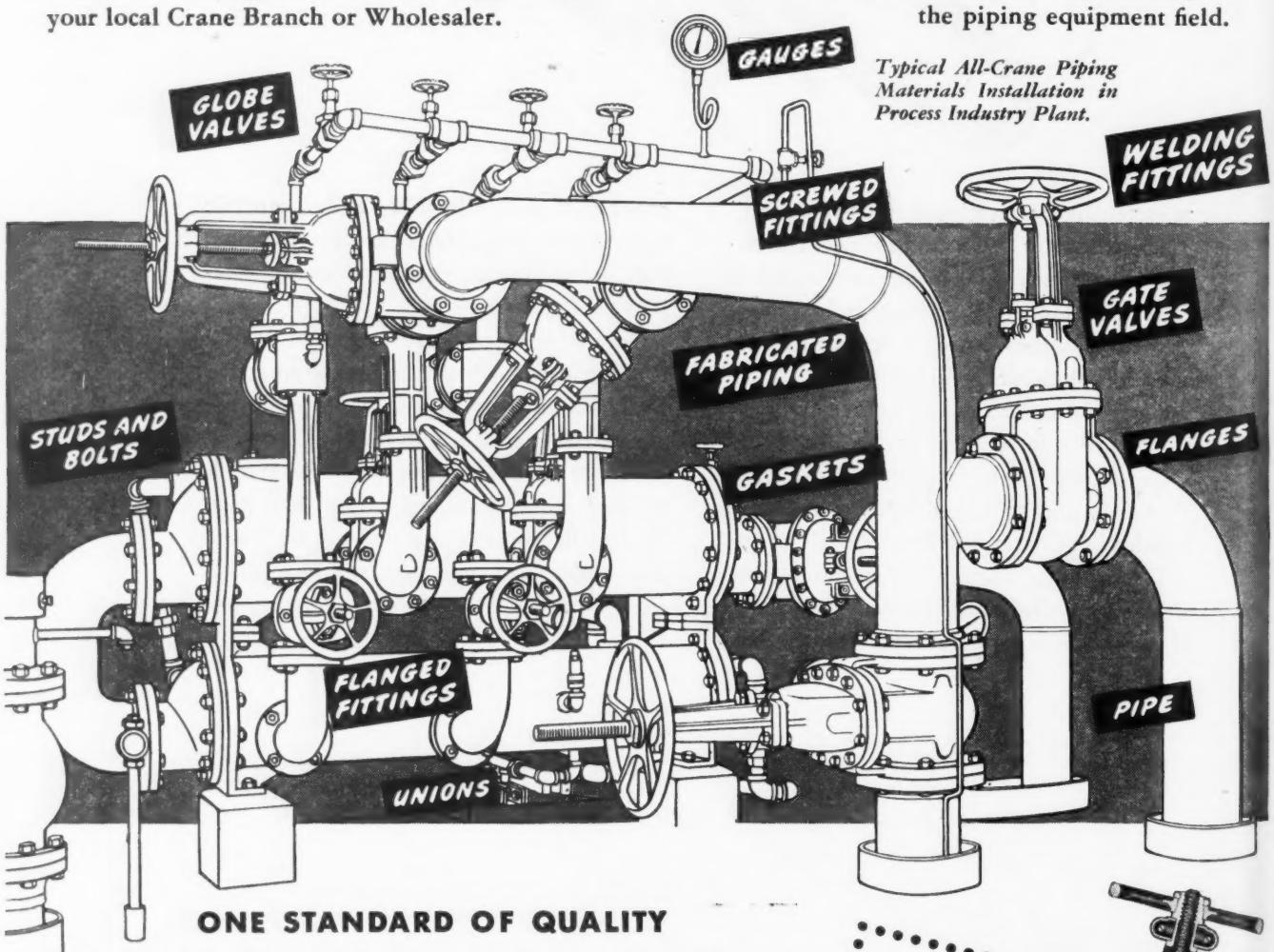

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Sanford-Day 10-ton drop-bottom cars at Kopperston.

Trip of Carnegie-Illinois cars entering rotary dump at Kopperston.

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Timken Bearing Equipped mine cars help at this modern mine property—one of the largest producers in the entire bituminous industry.

Car equipment on Timken Bearings comprises 10-ton drop-bottom cars built by Sanford-Day Iron Works, Knoxville, Tenn., and 5-ton conventional cars built by Carnegie-Illinois Steel Corporation.

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More mine cars have gone on Timken Bearings during the last 20 years than on all other makes of anti-friction bearings combined — over 400,000. The Timken Roller Bearing Company, Canton 6, Ohio.

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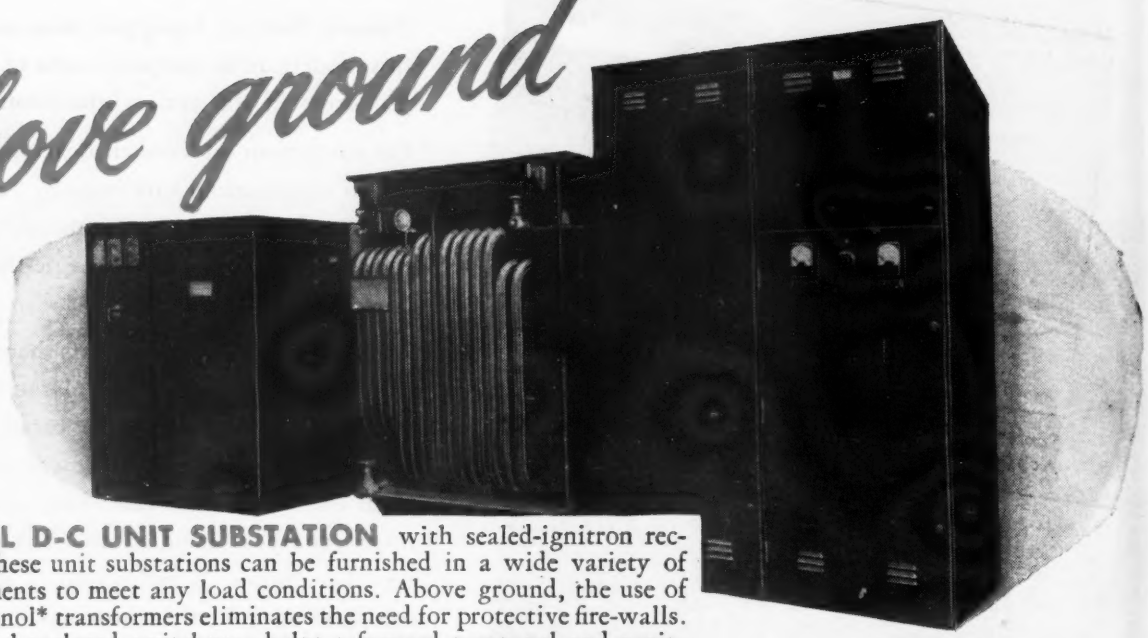
TRADE MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

Miners' homes at Kopperston, W. Va., one of the most modern mining communities in the country.

Tapered Roller TIMKEN BEARING EQUIPPED

D-C RIGHT

Above ground



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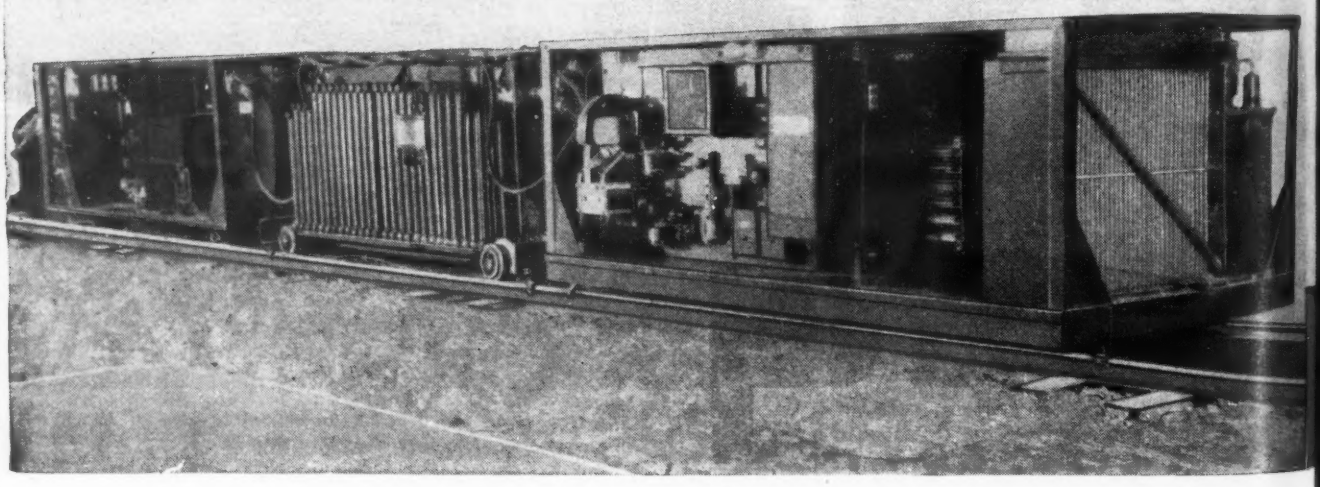
**Pyranol is General Electric's trade-mark for a synthetic cooling and insulating liquid that will not burn.*

or below

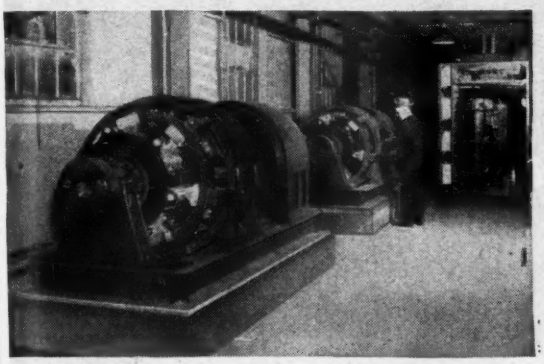
PORTABLE UNDERGROUND D-C SUBSTATION, comprising 300-kw 275-volt G-E sealed-ignitron mercury-arc rectifier, Pyranol transformer, and complete automatic a-c and d-c switchgear, in a mine of the Sahara Coal Co., in Saline County, Ill. Use of such portable substations allows conversion to direct current thousands of feet closer to the working face—saves the tons of copper needed for long, low-voltage d-c feeders, assures full voltage for efficient operation of cutters, loaders, and other equipment.

Buy all the BONDS you can—and keep all you buy

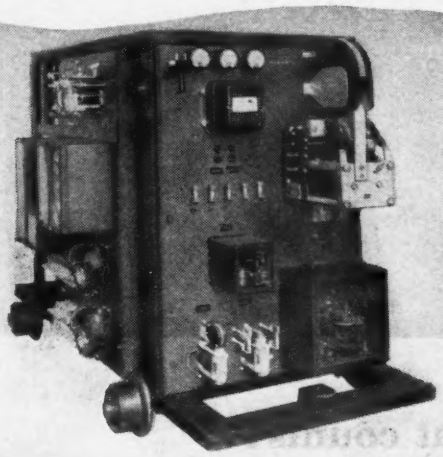


WHERE YOU WANT IT

Here's practical evidence that you can depend on G.E. for the *right* d-c power supply, backed up by the right switchgear to protect continuity all the way from the incoming power lines to the d-c at the working face.



THREE 250-KW G-E MOTOR-GENERATOR SETS for supplying direct current in a large mine development. G-E synchronous converters are also available for mining service.



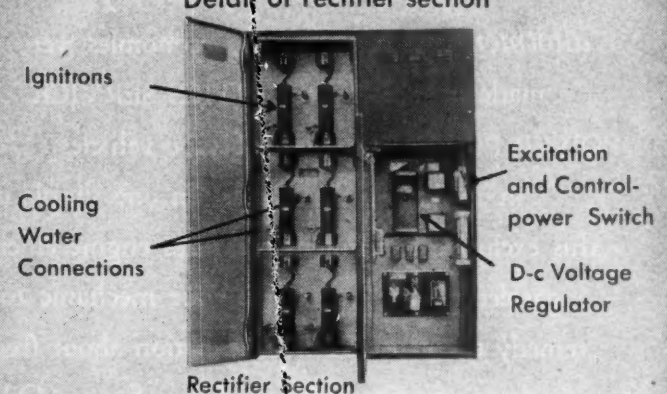
G-E PORTABLE AUTOMATIC SWITCHGEAR for controlling a 250-kw induction m-g set.

General Electric Co., Schenectady 5, N. Y.

For HIGH Conversion Efficiency

G-E SEALED-IGNITRON MERCURY-ARC RECTIFIERS

Detail of rectifier section



G-E sealed-ignitron rectifiers, the heart of the stationary and portable unit substations shown on the opposite page, possess high over-all efficiency over the entire load range. In addition, they offer the advantages of low maintenance cost, quick starting, and freedom from high starting-inrush currents. Like other components of G-E unit substations, these rectifiers are easy to install and easy to relocate if load requirements change.

GENERAL ELECTRIC

EXAMPLE OF *Service*:

Saved: 15% to 30% of daily fuel allotment... These amazing economies were made possible by the CITIES SERVICE POWER PROVER in a test of 4200 vehicles in 175 automotive fleets. In one simple operation this exclusive instrument measures engine efficiency... registers gasolene waste... enables your mechanic to track down and remedy the causes. For information about free POWER PROVER demonstration write to: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

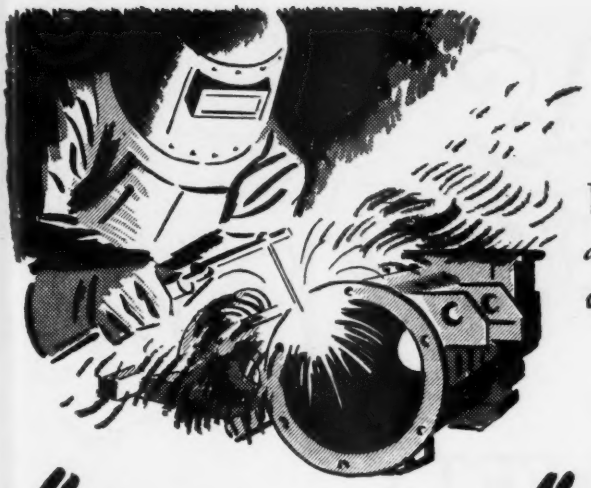
More and more, it's service that counts...

and *Cities Service* means good service!

CITIES SERVICE OILS — ONCE-ALWAYS

CITIES SERVICE OIL COMPANY

ARKANSAS FUEL OIL COMPANY



With coal production at its present peak, many over-age motors must be kept on the job. Here's one way coal companies are doing it.

"Worn-out" Locomotive Motors

GO BACK GOOD AS NEW

Passing over rail joints day after day gives these motors a severe pounding. Wear is bound to develop in housings, tapped holes and axle bearing parts.

In normal times, badly worn motor frames would be discarded. But not today. A service developed by Westinghouse *Manufacturing and Repair** Plants, conveniently located in your district, is keeping them on the job.

Worn frames are delivered to Westinghouse M & R Plants. By a special welding process, tapped holes, housings and axle bearing parts are built up, then redrilled and remachined. The frames are returned as good as new, ready for many more years of service.

Many large coal companies use this Westinghouse M & R service . . . another example of the ability of this factory-trained organization to handle electrical repair problems economically and efficiently. J-90518-A

WESTINGHOUSE PRESENTS
. . . JOHN CHARLES THOMAS
SUN. 2:30 EWT., NBC.
. . . TED MALONE
MON. WED. FRI. 10:15 EWT., BLUE NET.

When vital electrical equipment needs repair . . . phone the nearest office of Westinghouse Electric and Manufacturing Company for

Westinghouse

COMPLETE REPAIR SERVICE

*33 M & R PLANTS • • ONE NEAR YOU

This EXTRA SAFETY is *Imperative* Today!

The handling of explosives is a job that must always be done carefully. Today's often inexperienced labor makes it imperative that every last man on the blasting job be given every last measure of protection.

Atlas Manasite detonators, built to withstand greater impact and friction, are putting EXTRA SAFETY on blasting jobs everywhere. In addition, Atlas Manasite detonators are so effective as a blasting tool, so reliable in action, that millions and *millions* have been used since their introduction only five years ago.

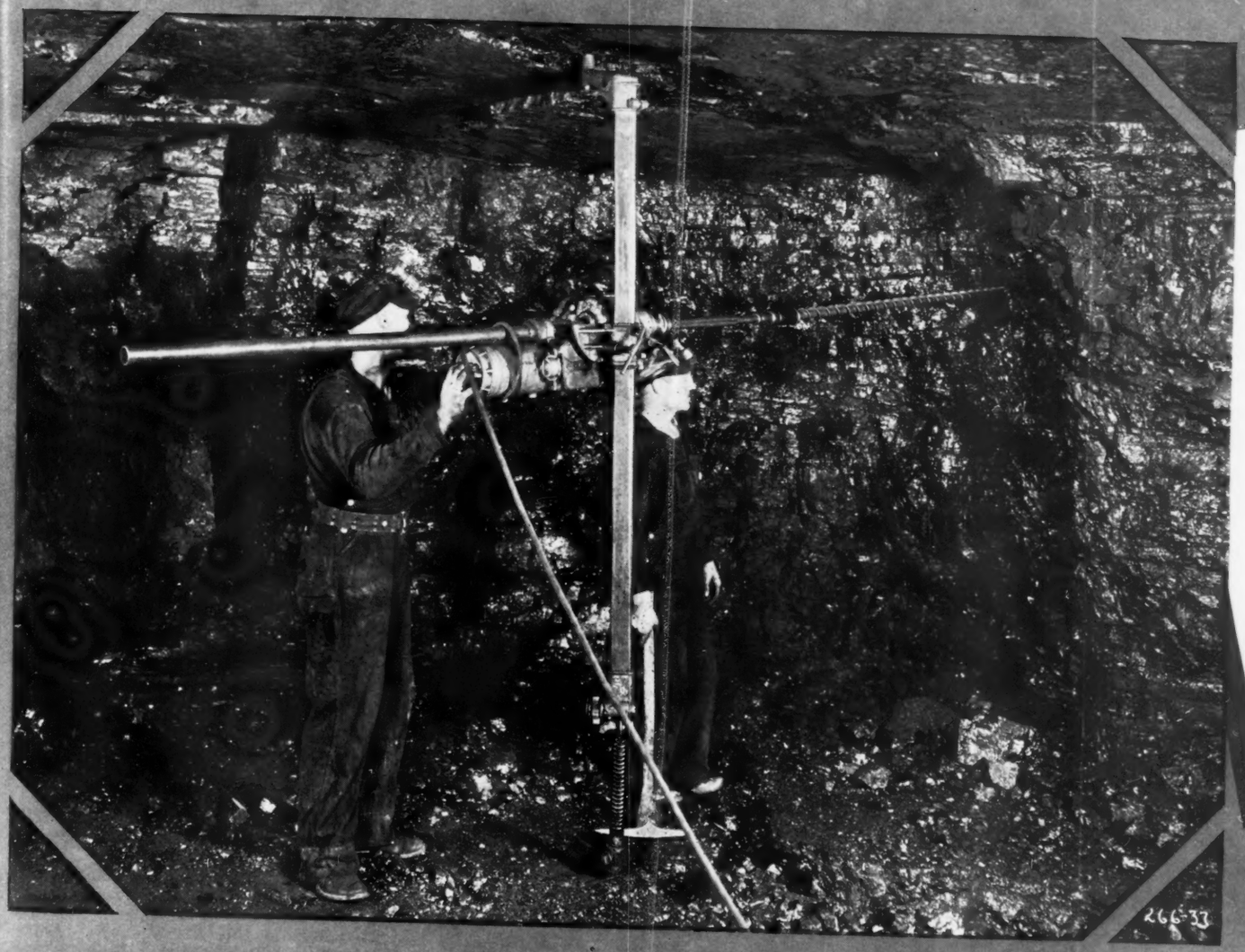
You get this added safety at no extra cost.
Let our representative give you ALL the facts.

Manasite: Reg. U. S. Pat. Off.

ATLAS EXPLOSIVES
"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • *Offices in principal cities* • *Cable Address—Atpowco*



JEF

Coal was dr
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The old ha
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In contra
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mining.
capable

Also li
(track-

Consu

Showing the Progress of

JEFFREY

COAL DRILLING EQUIPMENT

JEFFREY PROGRESS

Coal was drilled and shot down long before modern haulage and loading machines were developed.

The old hand-propelled drill on the first page is an early model Jeffrey drill. Directly below on this spread is illustrated one of the early type Jeffrey drills in operation.

In contrast with these note the compact, high-powered Jeffrey A-6 post drill (left) now commonly used in mechanical mining. This unit is portable, comparatively light in weight, capable of high speeds and more holes in less time.

Also lightweight Hand Held drills and drilling machines (track-mounted) with multiple drills.

Consult Jeffrey on your drilling needs.

JEFFREY

Mechanical Mine Equipment Since 1880

From an old Jeffrey album — an early model hand drill

BUY WAR BONDS

EY
ce 1880

Y WAR BONDS

Jeffrey

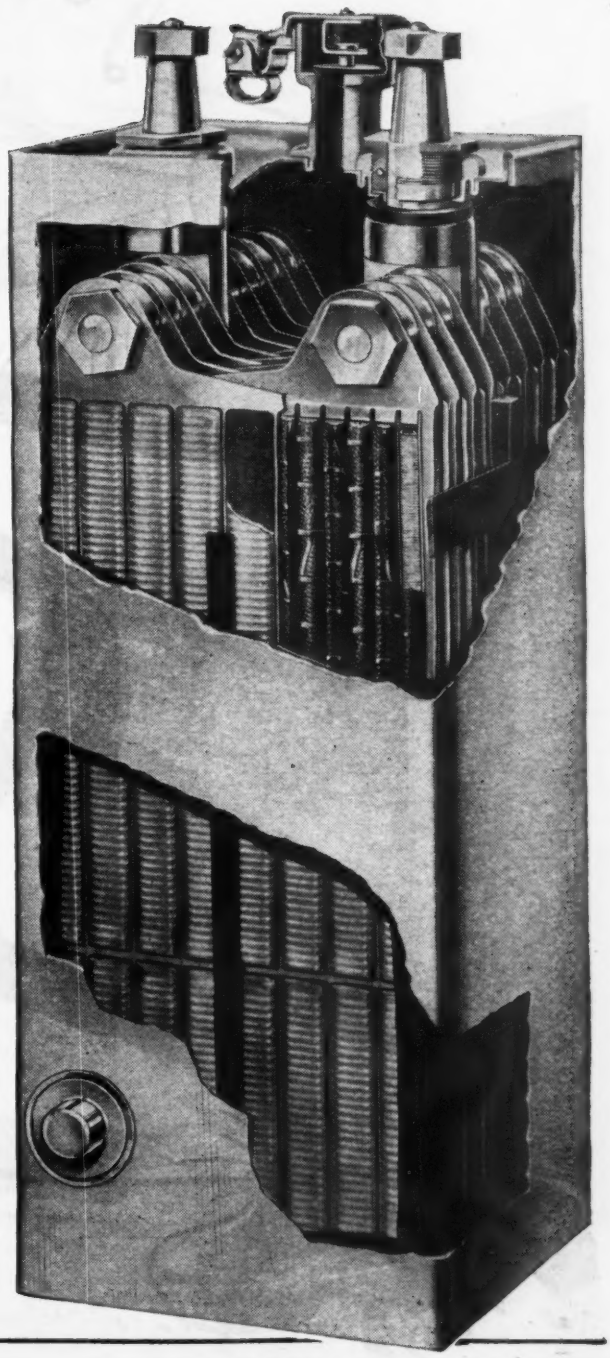
SERVES THE INDUSTRY
BELOW AND ABOVE GROUND
FROM FACE TO RAILROAD CAR

CUTTERS
DRILLS
LOADERS
LOCOMOTIVES
FANS
CONVEYORS
BLOWERS
JIGS
CRUSHERS
SCREENS
RENEWAL PARTS

THE JEFFREY MANUFACTURING COMPANY
Established in 1877
912-99 NORTH FOURTH STREET, COLUMBUS 16, OHIO

Sales Offices:	Baltimore Birmingham Boston Buffalo	Chicago Cleveland Cincinnati Detroit	Denver Harlan Houston Huntington	Milwaukee New York Philadelphia Pittsburgh	Scranton St. Louis Salt Lake C
Service Stations:	Pittsburgh Harlan, Ky.	Birmingham St. Louis	Logan-Beckley W. Va.		Scranto
Foreign Plants:	Jeffrey Mfg. Co., Ltd. Montreal, Quebec	British Jeffrey-Diamond, Ltd. Wakefield, England		Jeffrey-Galion (Pty), Ltd Johannesburg, S. A.	

MOST RUGGED OF ALL



Here is a cut-a-way view of a single cell of a typical Edison Alkaline Battery for operating mine haulage equipment. Note the ruggedness and precision of its construction. The container, cover, pole pieces and other structural parts are made of STEEL. Even the active materials are permanently locked in perforated STEEL tubes and pockets. These in turn are securely assembled into STEEL grids to form the positive and negative plates. The STEEL cover is welded onto the container. In every detail, this is an entirely different cell construction than that employed in other types of storage batteries . . . and every difference is an advantage to users of alkaline batteries in locomotives and shuttle cars.

Because of their STEEL cell construction, they are by far the most rugged and durable of all batteries. When it comes to standing up under hard, rough usage in mine service, they have no equal. Alkaline batteries in mine haulage service have fallen down shafts and gone through many wrecks with little or no damage . . . and still delivered their full service life. The fact they can withstand such accidents, indicates the extra dependability that can be expected of them under more normal conditions. Their durable mechanical construction is also one of the principal reasons why alkaline batteries stay on the job and out of the repair shop, give longer life and help cut haulage costs. *Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, New Jersey.*

Edison
ALKALINE BATTERIES

You wouldn't
S. Berger

put a diding suit on a POLE VAULTER

LAY·SET Preformed IS LIMBER

Putting non-preformed wire rope on your machines is like expecting a pole vaulter to make a record when dressed in a diving suit. You shouldn't expect a wire rope that is twisted tightly and under constant tension to operate well and long.

In Hazard LAY-SET Preformed every wire and strand is pre-shaped at the mill to the exact helix it must assume in the finished rope. That's why LAY-SET is at ease, relaxed, more flexible, and perfectly willing to work. Being free of torsional stresses and strains, being unhampered by twisted effort, Hazard LAY-SET Preformed lasts longer, gives you greater dollar value. Be sure your next rope is Hazard LAY-SET Preformed.

Hazard LAY-SET Preformed Wire Rope is "in the service" on countless jobs for the Armed Forces where it is proving its many advantages. Specify it for *your* use.

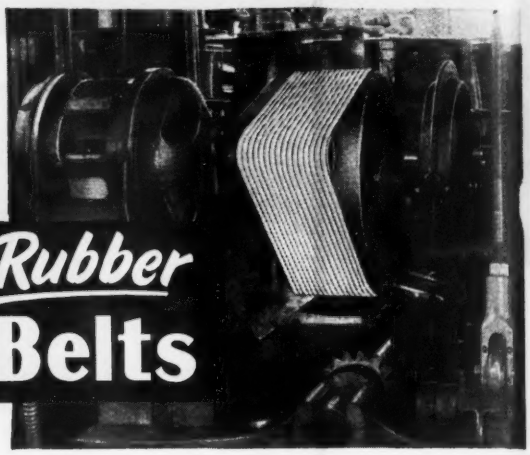
HAZARD WIRE ROPE DIVISION · Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Fort Worth, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma
AMERICAN CHAIN & CABLE COMPANY, INC. · BRIDGEPORT · CONN.

ARMY E NAVY

GREEN SIGNIFIES SAFETY

HAZARD LAY·SET Preformed WIRE ROPE

ONE EXAMPLE: On this drive, operating conditions gave the belts a severe soaking with oil. Gates special synthetic V-belts were installed. They are giving more than twice the service life of any belts previously used.



In Hundreds of Plants—

GATES *Synthetic Rubber* V-Belts

Are *OUTWEARING* Any *NATURAL RUBBER V-BELTS* Ever Used!

Now that every V-Drive in your plant depends upon belts made of synthetic rubber it pays to know that Gates Synthetic Rubber V-belts have been in nation-wide use for *more than 6 years*—and through all that time they have been giving service actually superior to belts of *natural rubber!*

There is naturally a reason for this marked superiority of Gates synthetic rubber belts—and here it is:

Gates began making large quantities of belts entirely of synthetic rubber long before synthetic rubber came to be thought of as merely a *substitute* for natural rubber. Gates used synthetic rubber not as a substitute but as an *improvement*— in fact, Gates chose a very *special* synthetic for the one reason that it is, in many important respects, *greatly superior* to natural rubber.

*There are, of course, many kinds of synthetic rubber. Gates uses each kind where it best meets some particular service need.

For Example:—One special synthetic rubber which Gates uses extensively in making V-belts has the ability to withstand oil and heat much better than natural rubber can. Where oil and heat conditions are especially severe, Gates special synthetic V-belts are giving 3 times to 4 times the service life of any natural rubber V-belts ever used.

This is the record not of a few belts over a limited period but of thousands upon thousands of Gates synthetic rubber V-belts installed in hundreds of plants and factories during the past 6 years.

Gates long headstart and outstanding success in making V-belts of synthetic rubber is of greater importance to you now than ever before because the entire operation of your plant today depends so largely on synthetic rubber V-belts.

You will gain a distinct advantage in V-belt service and operating efficiency by picking up your telephone directory and calling the Gates Rubber Engineer. (Just look under the heading "Gates Rubber.") He will bring right into your plant the full benefits of Gates' knowledge and experience —without the slightest obligation.

THE GATES RUBBER COMPANY

Engineering Offices and Stocks in All Large Industrial Centers

4411

GATES VULCO ROPE DRIVES

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NEW YORK CITY 215-219 Fourth Avenue
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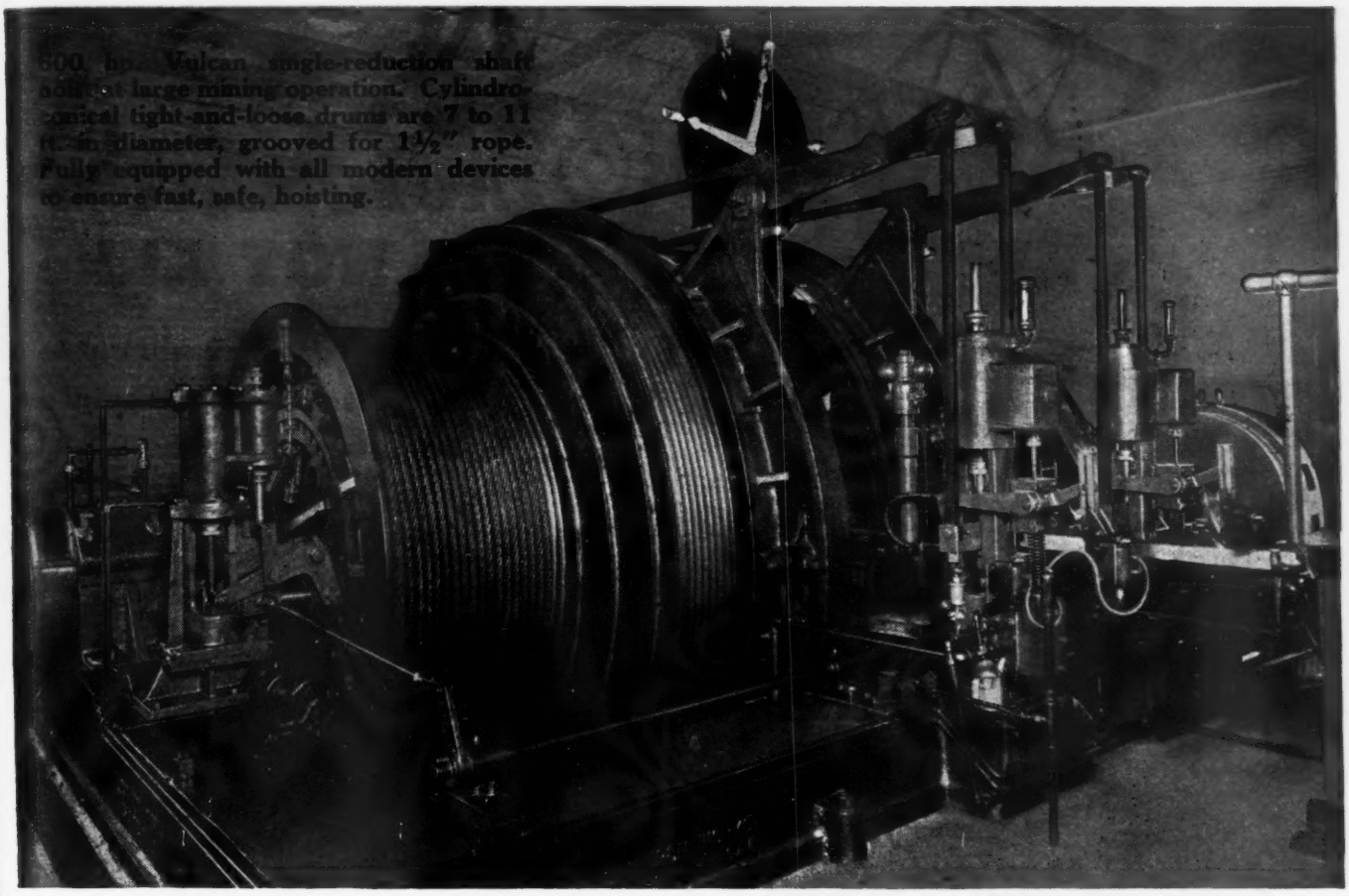
PORTLAND, ORE. 333 N. W. 5th Avenue
DALLAS, TEXAS 2213 Griffin Street
SAN FRANCISCO, CAL. 1090 Bryant Street



600 hp. Vulcan single-reduction shaft hoist at large mining operation. Cylindro-conical tight-and-loose drums are 7 to 11 ft. in diameter, grooved for 1½" rope. Fully equipped with all modern devices to ensure fast, safe, hoisting.

HEAVY-DUTY ELECTRIC HOISTS
SELF-CONTAINED HOISTS
SCRAPER HOISTS
CAR-SPOTTING HOISTS
ROOM HOISTS
"ALLCASTEEL" SHEAVES
SHAKING-CHUTE CONVEYORS
CHAIN CONVEYORS
CAGES, SKIPS, GUNBOATS
COAL-PREPARATION EQUIPMENT
STEAM LOCOMOTIVES
GASOLINE AND DIESEL LOCOMOTIVES
DIESEL-ELECTRIC LOCOMOTIVES
LOAD-CARRYING LARRIES

Fast Because They're Safe

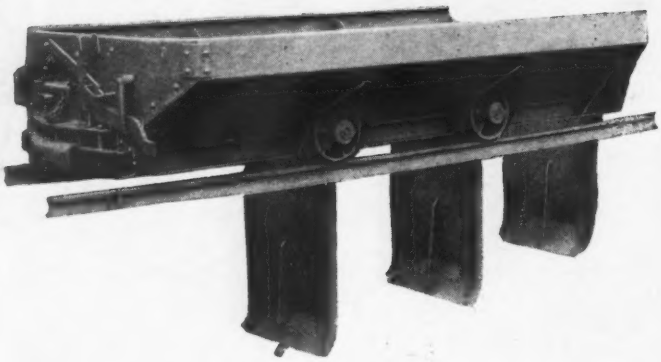
When SPEED is demanded from the operator of a Vulcan heavy-duty hoist he can deliver plenty because his mind is free to concentrate on just that and nothing else. No mistake that he can possibly make—no electrical failure—no physical disability that might suddenly dim his mind or weaken his hand—can have any unpleasant consequence. If an error is made while the hoist is at rest it cannot start. If made while the hoist is in motion it comes to a quick smooth stop. That's ALL that can happen.

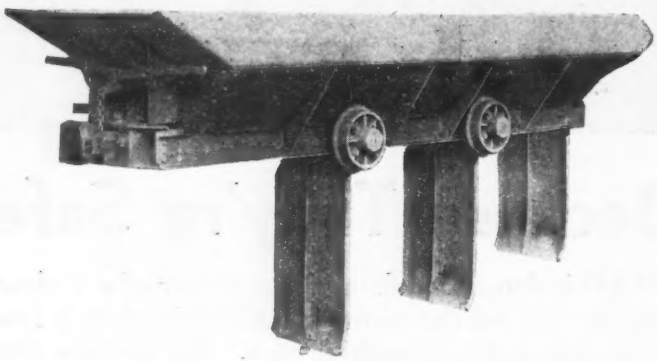
Safety comes first in the design of Vulcan heavy-duty hoists and means more than modern safety devices. It means an extra margin of strength and quality that has made them the standard of the mining world for more than sixty years.

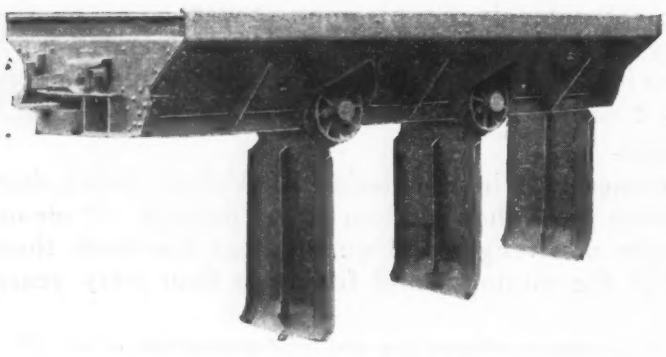
Bulletin A-371 contains illustrations and brief descriptions of several modern Vulcan Heavy-Duty Electric Hoists. Also complete instructions for installing and adjusting ropes on large hoists with minimum difficulty and expense. If you have not already received your copy write for it today. No charge or obligation of any kind.

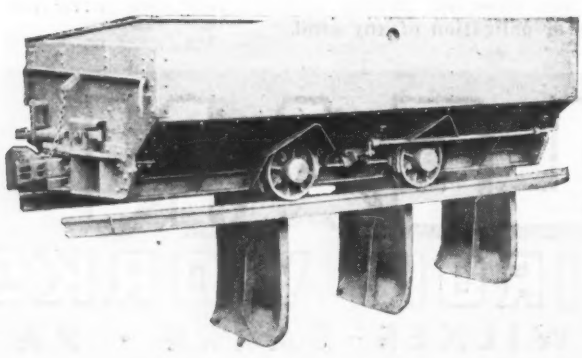
VULCAN IRON WORKS ESTABLISHED 1849

VULCAN
NEW YORK OFFICE
50 CHURCH STREET
IRON WORKS
WILKES-BARRE • PA •









ALL S-D 1-2-3 "AUTOMATICS" Are NOT Alike

But the same remarkable 1-2-3 Automatic principle is built in every car.

★ Every S-D 1-2-3 "Automatic" mine car is built to meet the particular requirements of the mine using it. Heights, widths, lengths, loading and dumping conditions and a dozen other problems are involved. This is why our engineers cooperate thoroughly with you before S-D 1-2-3 "Automatics" are produced. It is this thorough engineering job that makes S-D 1-2-3 "Automatic" installations smooth running from the start.

But in all S-D 1-2-3 cars, regardless of size and shape, the "Automatic" action is identical . . . the rewards of which always are the same. Increased tonnage, greater turn-over of cars, fewer cars, faster, safer haulage—lower costs per ton of coal produced (savings so great they often pay for the cars in 12 to 18 months) and conservation of man power (so muchly needed now).

S-D 1-2-3 "Automatics" are recognized, more than ever before, by leading mining men, as essential equipment for maximum production at the lowest cost per ton. An investigation will convince the most skeptical "Doubting Thomas".

You Can Have S-D 1-2-3 "Automatics" on a RENTAL PLAN

You may have all the advantages of S-D "Automatics" on a rental basis, and your savings will more than pay the rentals. All the time, you will have an option to purchase the cars and terminate the rental contract. This proposition is proof of our claims of what these cars will do for you.

SANFORD-DAY IRON WORKS

KNOXVILLE TENESSEE

Amerclad Single-Conductor Locomotive Gathering Cables. Specially designed for electric mine-locomotives of the gathering-reel type, but suitable for any purpose that requires a flexible single-conductor portable cable to withstand hard usage, acid waters, and operation at high tempeartures.

Amerclad Twin Parallel Mining Cables. Lighter in weight than two-conductor round cables of the twisted type, and occupying less space on a reel or drum. Many users prefer them as they are easy to splice and the heavier insulation between conductors affords greater protection against heavy impact or crushing weight.

AMERCLAD

. . . a bear for punishment . . . a beaver for work

EVER notable for long life, Amerclad Cords and Cables are built tough to stand the hard knocks of wartime speed up. Light, flexible and easy to handle, they can be pulled through puddles, dragged over rough ground, subjected to reeling and unreeling, or exposed to severe chemical action. Yet they keep right on delivering an uninterrupted flow of power. Their stamina is built in.

Even now, when crude rubber is not available and the use of Neoprene is greatly restricted, we have developed synthetic rubber compounds for use in Amerclad Cords and Cables to carry on the old tradition of trouble-free service.

Here's an invitation. Pick out your toughest portable cable job. Next time that cable needs replacement, use Amerclad. Your mine should have the benefit of the time and money-savings that Amerclad insures.

We manufacture for mine use:

- Electrical Wires and Cables of all kinds
- Tigerweld Power Bonds
- Aerial Tramways
- American Tiger Brand Wire Rope (Excellay Preformed or Standard Non-Preformed)
- Wire Rope Clips, Slings and Fittings

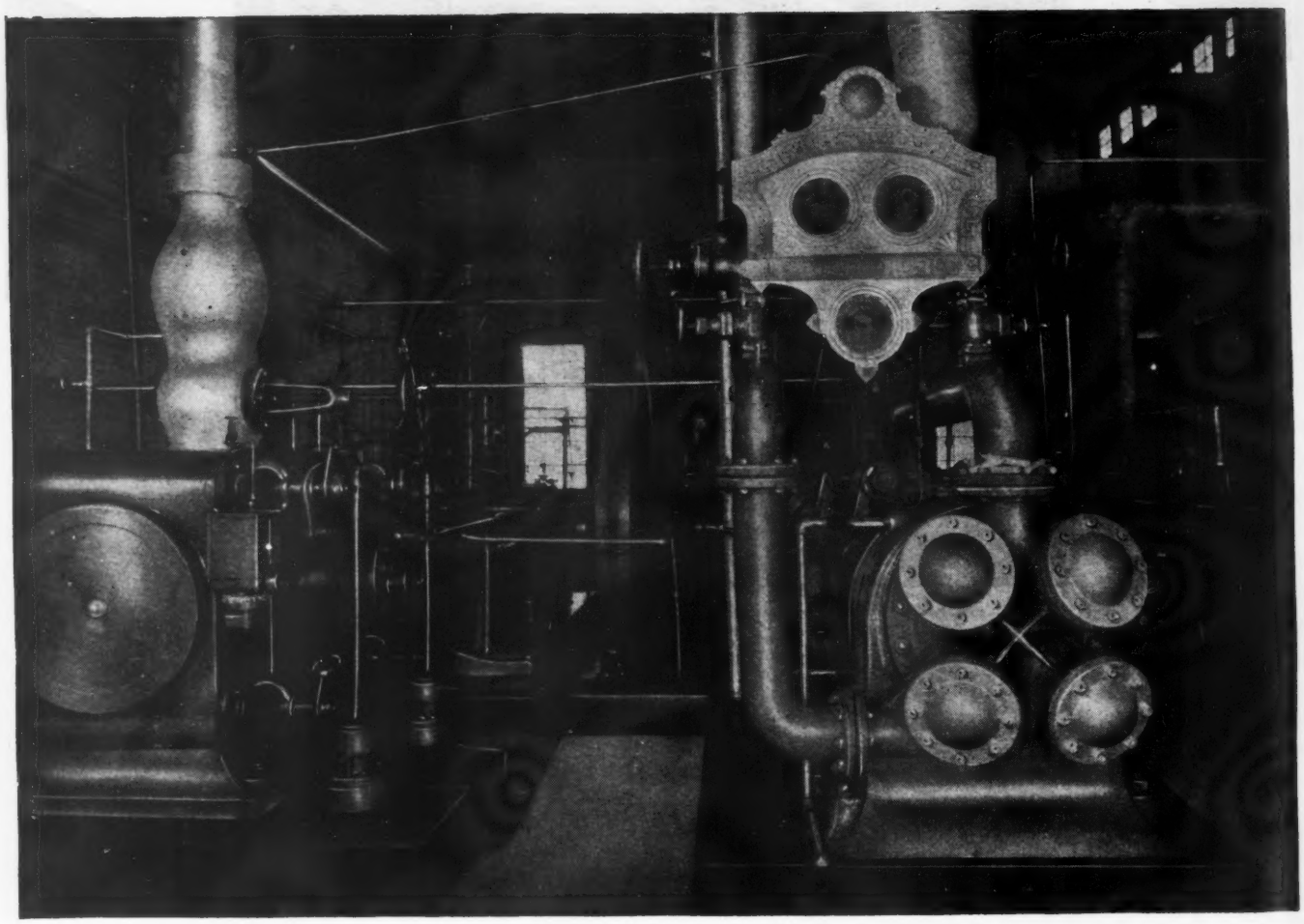
AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

For Anthracite Service: Miners Bank Building, Wilkes-Barre, Pa.
Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Export Company, New York

UNITED STATES STEEL

BETTER *Lubrication* Means Better Maintenance



Is difficult maintenance a problem? Maybe excessive wear due to inefficient lubrication is the cause. That's where Sinclair STEAM CYLINDER and VALVE OILS can help.

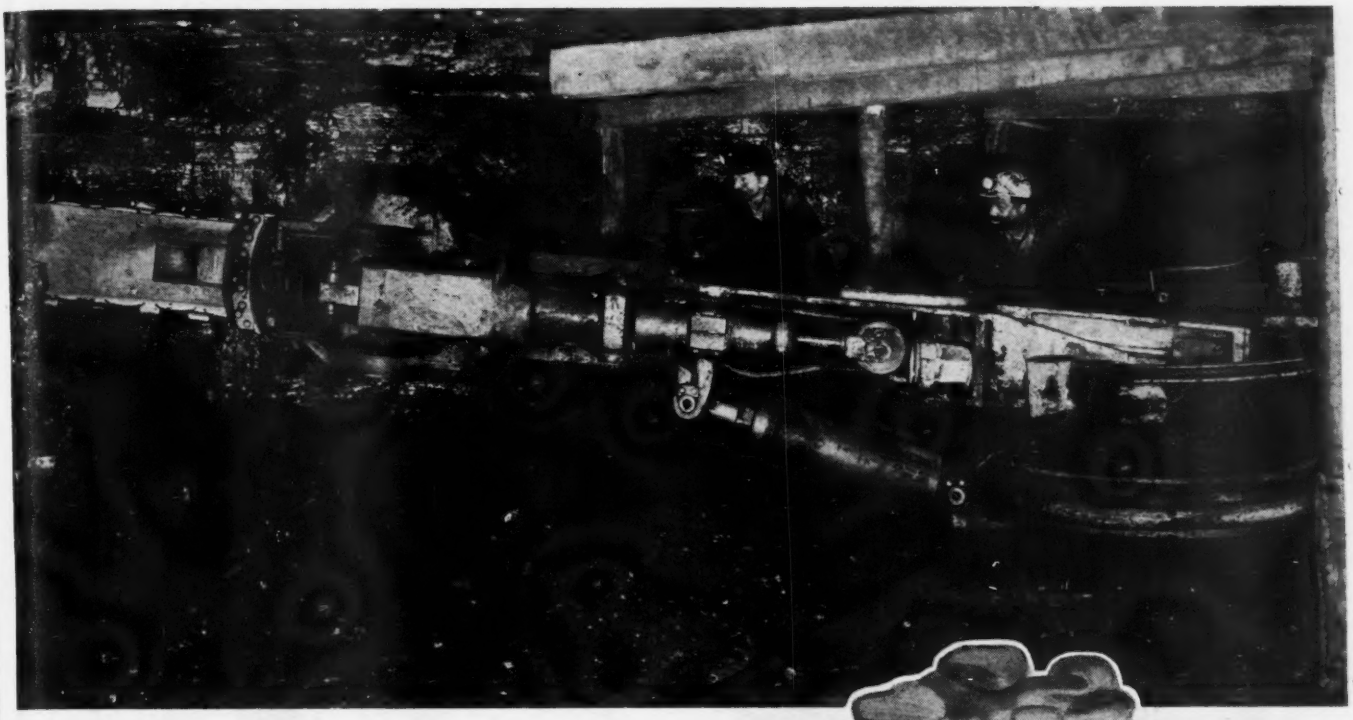
These oils have a long record of perfect performance in heavily loaded installations . . . correctly meet all requirements of power house operation . . . are exactly suited to the design and operating characteristics of all types of engines.

• • •

(Write for "The Service Factor"—published periodically and devoted to the solution of lubricating problems.)

SINCLAIR INDUSTRIAL OILS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.



THE PROFIT IS IN THE LUMP!

THE straighter the rib, the greater the percentage of lump—and profit—for you. To see the Sullivan 7-AU in action is to learn how it can increase production and lower the cutting costs in your mine.

Watch this powerful machine make parallel rib shears more than 21 feet apart, resulting in a straighter rib and more lump. See how the cutter bar swings swiftly and surely into position to make a horizontal cut, up to 41 feet wide anywhere from 10 inches below rail to 102 inches above rail. Notice how the 7-AU can make two cuts from one laying of track or cut or shear a room neck without requiring turnout switches.

Then, when you learn that the Sullivan 7-AU is simply designed—only 20 gears and 6 hydraulic valve-levers—you'll know why it can increase production—and profit—in your mine.

SULLIVAN MACHINERY COMPANY, Executive Offices: Michigan City, Indiana. In Canada: Canadian Sullivan Machinery Co., Ltd., Dundas, Ontario.

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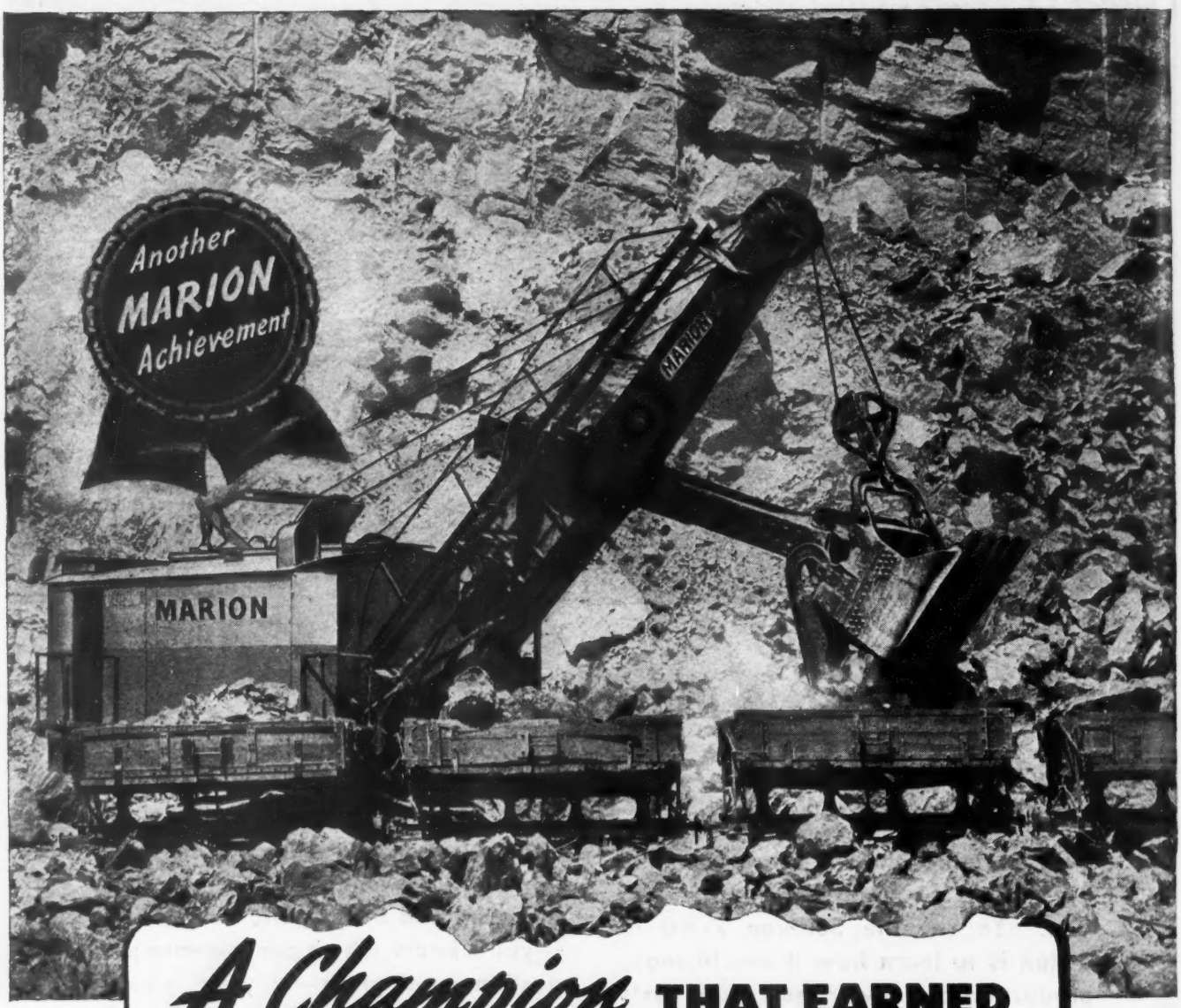
SULLIVAN

Coal Mining Machines • Scraper Haulers • Rock Loaders • Hoists • Car Pullers • Air Compressors • Coal Drills • Rock Drills • Cutter Bits • Sharpeners and Heaters • Core Drills and Contract Core Drilling.

SULLIVAN 7-AU IS LICENSED UNDER PATENTS TO E. C. MORGAN, PATENTS NUMBERS 170931 — 170992 — 1707132 — 1953825 — 1953326.

MODERN MACHINES FOR EVERY MINING METHOD



A Champion THAT EARNED ITS TITLE THE "HARD WAY"

This MARION 3 cu. yd., 492 shovel was designed to give that "extra something" needed for heavy digging.

Their performance in rock, coal and ore stamps them as record-breaking champions.

What are your material handling problems? Let's discuss them.

THE MARION STEAM SHOVEL COMPANY • MARION, OHIO

Modernize with **MARION**

SHOVELS • DRAGLINES • CRANES • CLAMSHELLS • WALKERS • PULL-SHOVELS
COAL LOADERS • STRIPPING SHOVELS • GAS • DIESEL • ELECTRIC (From ¾ cu. yd. to 35 cu. yds.)

Get the RIGHT steel tie

FOR USE WITH MECHANIZED CUTTERS AND LOADERS

When you look at a Bethlehem No. 5 Steel Tie, you're apt to be impressed, first of all, by its ruggedness and "starch." This impression is strengthened when you handle it—for the No. 5, though easy to carry, weighs 5 lbs. per ft. of section; has plenty of guts to withstand the wear and tear of today's mechanized equipment.

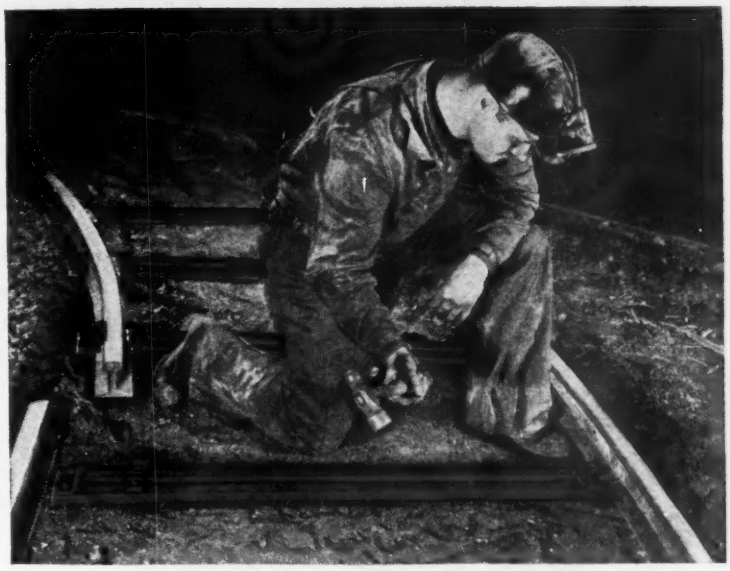
Where heavy rail-mounted cutters and loaders are used, you simply can't afford light ties in your track layouts. They're poor economy, because the crushing weight of the motors and the cutting and loading machines will soon cause an undersized tie to buckle, bend, and start on its way to the junk yard.

For this reason, mine operators have been quick to recognize the advantages of Bethlehem's No. 5. It's specifically designed for the 40-lb. rail that is now so common in rooms, entries, and secondary haulageways. And its lasting qualities are demonstrated by the fact that it can be used over and over as layouts are removed—even when bottom conditions are not of the best.

It will outlast several sets of wooden ties, for there's no spiking and hence no spike-killing. Simply slip a No. 5 under the rails and knock the rotating clips into place with a hammer. That's all there is to it. Removal is just as easy.

If you haven't yet investigated these husky steel ties, ask a Bethlehem engineer to explain their advantages. He'll be glad to point them out—with many case histories to back up his statements.

★ ★ ★ BETHLEHEM STEEL ★ ★ ★



ROCK *or* DIRT
DUMPED INSTANTANEOUSLY

Moving rock or dirt at high speed requires speed in all operations. Koehring Dumptors save seconds every time the load is dumped . . . instantaneously. Seconds saved speed production. Rock or dirt is dumped equally fast and the load is dumped clean every time . . . ready for a full load every trip. KOEHRING DUMPTORS HAUL ROCK OR DIRT FASTER THAN ANY OTHER METHOD.

KOEHRING COMPANY
Milwaukee 10, Wisconsin

DEPEND ON YOUR KOEHRING DISTRIBUTOR to help you keep your equipment operating. Care for your Koehring equipment *NOW*, so it will serve you tomorrow. Koehring distributors have genuine Koehring parts. Koehring parts warehouses are at your service.

ARMY E NAVY

KOEHRING HEAVY DUTY

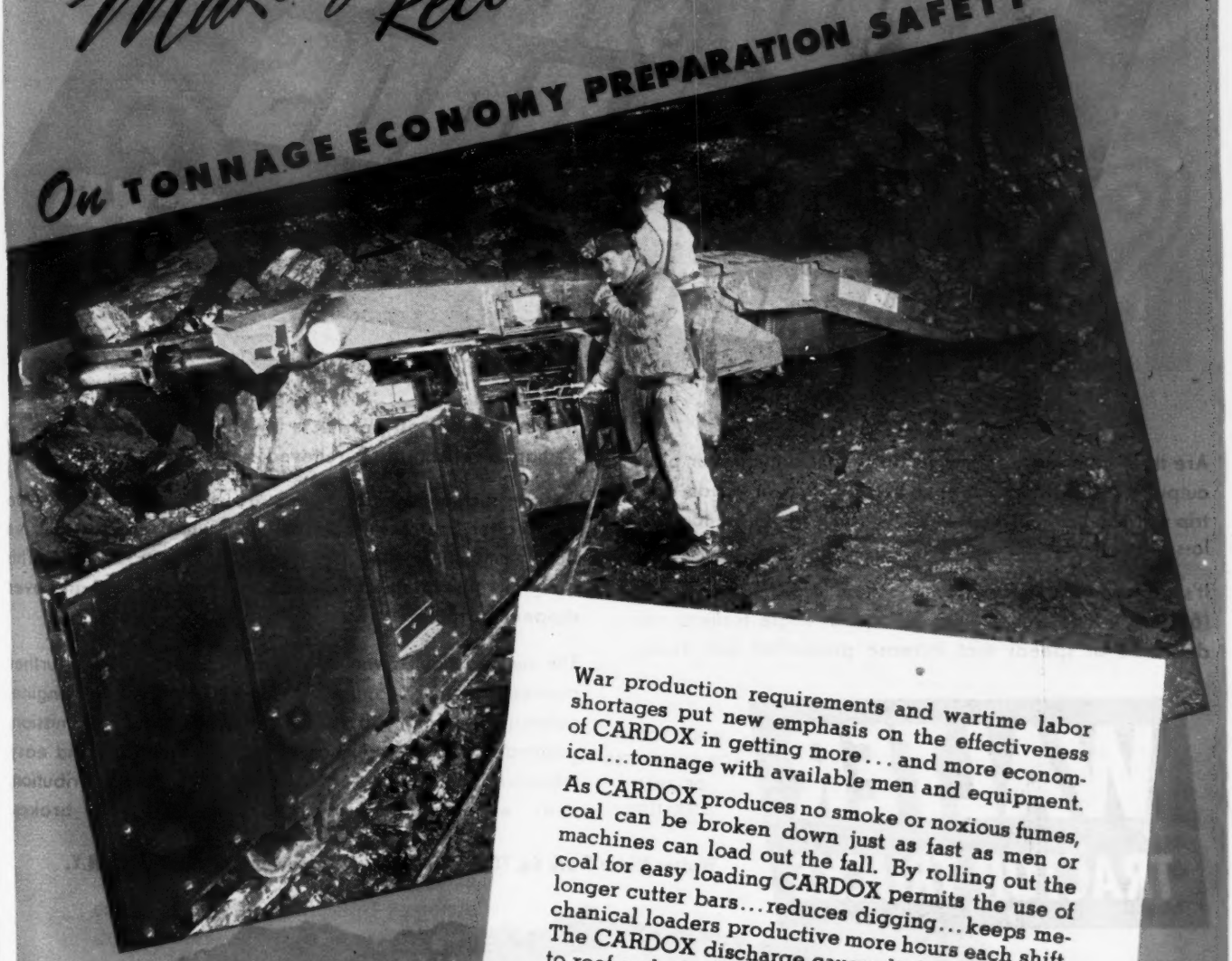
HEAVY-DUTY CONSTRUCTION EQUIPMENT

CARDOX

"THE NON-EXPLOSIVE MINING METHOD"

Making Records

On TONNAGE ECONOMY PREPARATION SAFETY



War production requirements and wartime labor shortages put new emphasis on the effectiveness of CARDOX in getting more... and more economical...tonnage with available men and equipment.

As CARDOX produces no smoke or noxious fumes, coal can be broken down just as fast as men or machines can load out the fall. By rolling out the coal for easy loading CARDOX permits the use of longer cutter bars...reduces digging...keeps mechanical loaders productive more hours each shift. The CARDOX discharge causes little disturbance to roof and rib structure...decreasing the roof and rib hazards responsible for 51% of underground fatalities. CARDOX-mined coal is not weakened by shatter-cracks. This reduces handling, shipping and storage losses resulting from degradation.

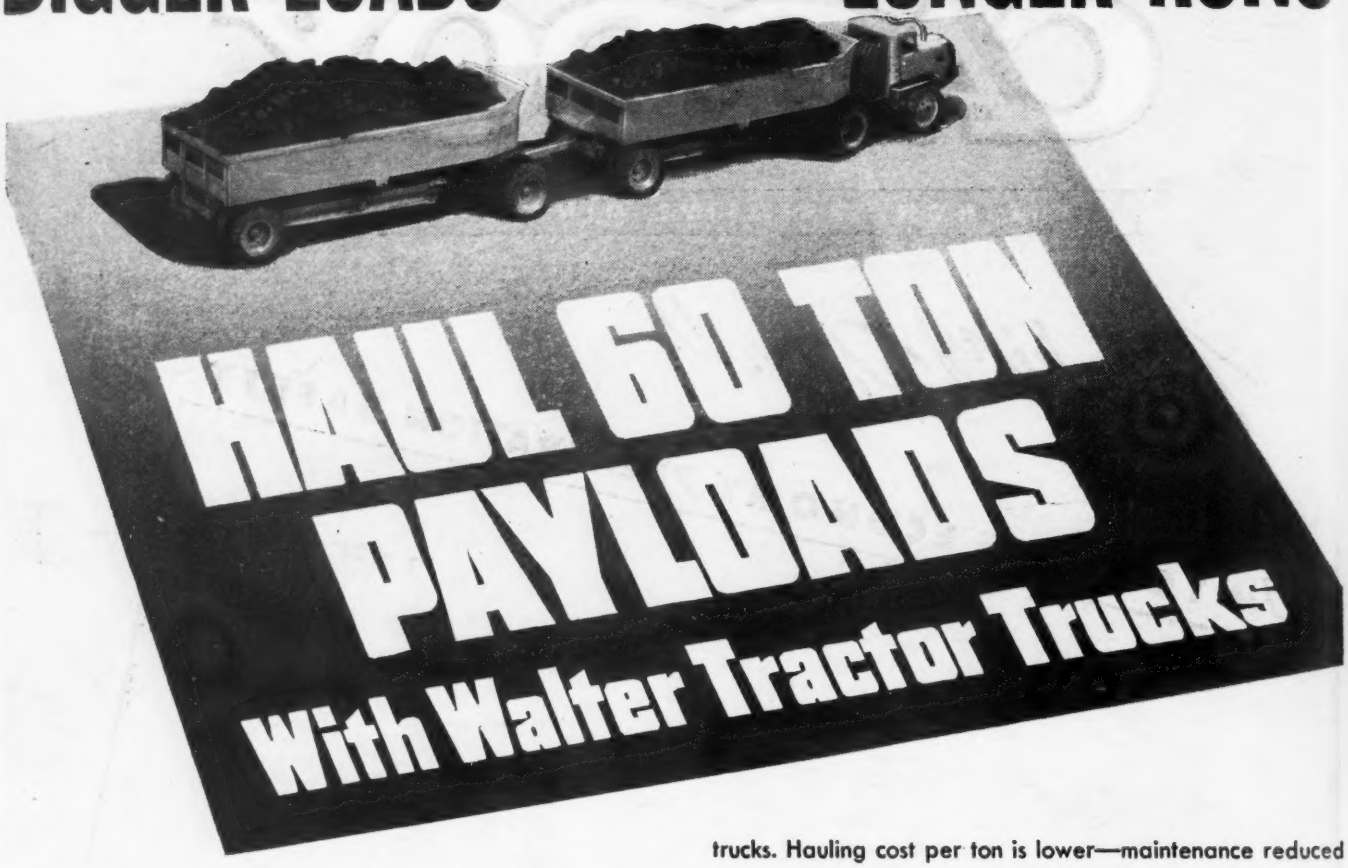
Write for details on free test of CARDOX in your own mine.

CARDOX HARDSOCG DRILLING EQUIPMENT

Complete line of drilling equipment designed to give you the maximum in drilling efficiency.

CARDOX CORPORATION BELL BUILDING · CHICAGO 1, ILLINOIS

BIGGER LOADS ARE THE ANSWER TO LONGER RUNS



Are the longer hauls from shovel to plant cutting your plant output? The logical answer is to haul bigger loads each trip with Walter Tractor Trucks—and cancel out the tonnage losses.

It's the economical answer, too, because these huge payloads (60 tons in two trailer units, 30 tons in single trailers) are delivered at speeds that increase production with fewer trucks. Hauling cost per ton is lower—maintenance reduced—manpower shortages relieved.

Despite such huge loads, roads are undamaged . . . due to the Walter Four Point Positive Drive which applies tractive power smoothly, without digging, churning or slipping. This is equally true on steep inclines, soft dirt, deep mud and over slippery surfaces.

The rugged haulpower of Walter Tractor Trucks is further assured by other features such as 300 H. P. Butane engine, automatic locking differentials, tractor type transmission, suspended double reduction drive. Safe handling and easy maneuvering are assured by scientific weight distribution, short wheelbase, hydraulic steering and air brakes.

WALTER
TRACTOR TRUCKS

WRITE TODAY FOR ILLUSTRATED DETAILED LITERATURE

Walter Motor Truck Co. 1001-19 Irving Ave. Ridgewood 27, Queens, L.I. N.Y.

The Cantrell Compressor is Indispensable to Efficient Coal Mining!

The Cantrell, Type SP is More Than a Dependable Air Compressor

The Cantrell Type SP Compressor is shown above. Its height is only 26 in. above rail. Length 12 ft. 6 in. Complete protection of all operating parts, from rock, slate or dirt falls is provided by removable steel top.

● To investigate the use of the Cantrell, Type SP, Air Compressor in any mine means to learn that it is rapidly becoming a standard, indispensable piece of mining equipment. No longer is it necessary to waste time and expense of men and locomotives in moving your compressor from place to place.

The Cantrell SP is an independently operated compressor. It is self tramming in itself, and in addition, serves as a locomotive in pulling cars for hauling crew and equipment from place to place, in all types of work.

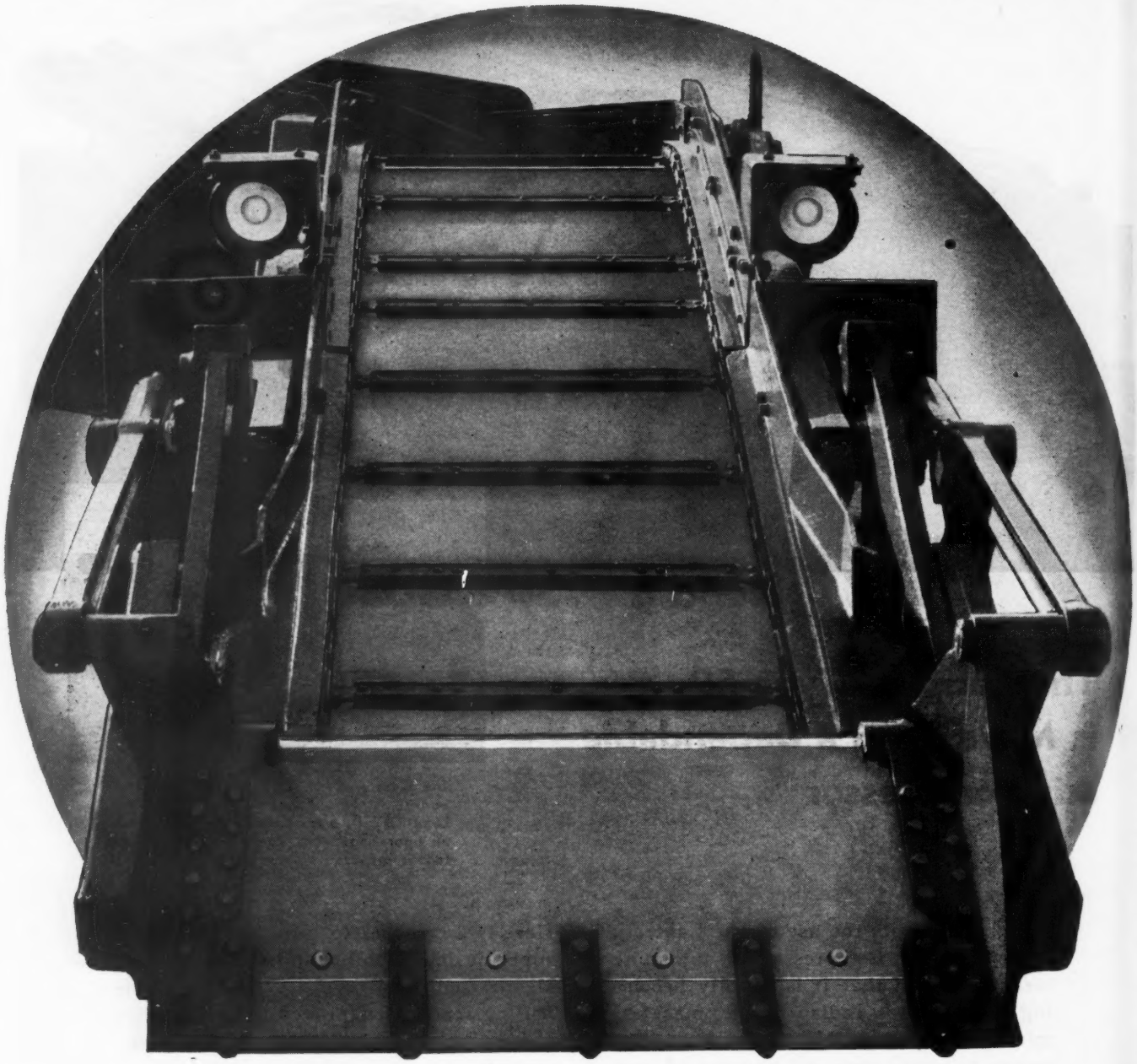
Furthermore, the Cantrell SP is available anytime for quick transfer of cars within the mine, taking the place of costly locomotives that may be needed for heavier hauling.

Here is a compressor that has proved its superior dependability in hard service for all air compressor service. Its self-propelling feature has proved its indispensability for faster, more economical operation.

The Cantrell SP is so essential in your mine for conserving manpower . . . so necessary for so many services, we know you cannot well afford to be without it. Let us give you the complete story. Write now to Imperial Bronze Manufacturing Co., Jellico, Tenn.

Cantrell COMPRESSORS

• Get Ready, with the Whaley "AUTOMAT" for Post War Competition



Designed and built to stand up and deliver the goods under the most severe conditions!

• The Whaley "Automat", first and foremost, is a high capacity, low maintenance coal loader. In addition, it has proved to be an outstanding machine in the heavier duty of complete seam mining where coal and slate or rock are shot together and loaded in one operation. You don't have to baby a Whaley "Automat".

The basic reason for the Whaley "Automat's" ability to stand up and deliver the goods under severe conditions is its smooth, automatic shovel action which is an exclusive feature of the Whaley "Automat". It is this smooth, easy, shoveling action that permits the Whaley "Automat", operated by only one 25 H.P. motor, to maintain an average loading rate of 3 tons per minute in coal, rock or any other loose material, with a maximum loading rate of 7 tons per minute.

Investigate the Whaley "Automat" and anticipate your loading machine requirements for 1945 and 1946 now. Remember, you get an all-purpose machine when you get an "Automat". Myers-Whaley Company, Knoxville 6, Tennessee.

MYERS-WHALEY

Mechanical Loaders Exclusively for Over 36 Years

HERE'S HELP
on equipment and manpower

•Contract Your Stripping and Mining Roads . . .

Avail yourself of contractor's men and machines. If you aren't already doing so . . . contract with construction companies to handle your road building, stripping and other mining work. Here is a new source of manpower — construction companies with their own men. Here is a new source of machine power — tractors, bulldozers, graders, waiting to be put to work.

Indorsed and backed by the WPB, this plan will help you overcome the manpower and equipment shortage . . . help meet the war requirements for ore. Investigate it! Let idle equipment boost your production.

Your highway officials or your Allis-Chalmers dealer will be only too glad to help you locate a suitable contractor.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

in the mines, RECONVERSION PROBLEM NO. 1 IS

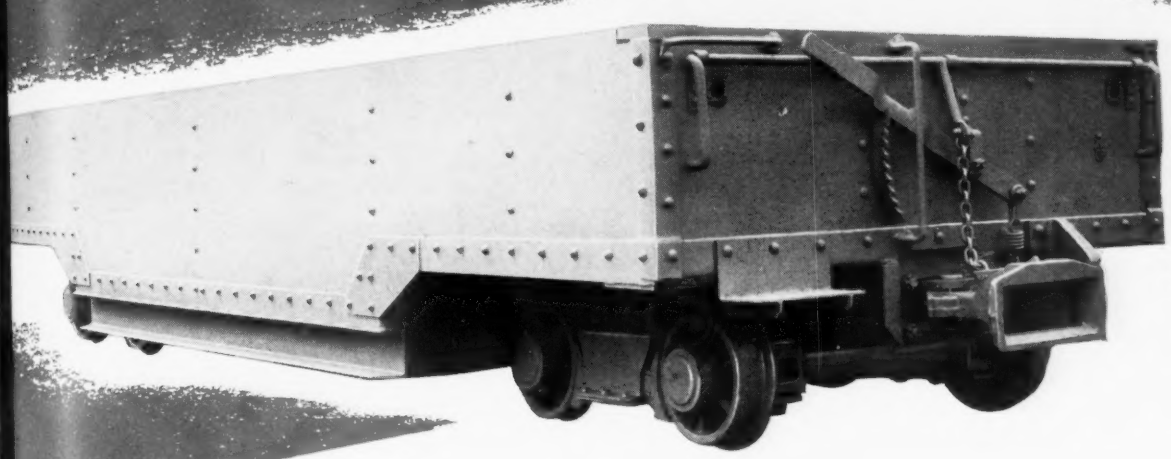
a.C.f. Chilled Tread Mine Car Wheels, as manufactured under our heat-treating process, are made from a special mixture of metals — better for mine car wheels than steel or iron alone.

a.C.f. DROP BOTTOM CAR

A strong car made with through axles, well riveted and welded, with spring bumpers. If you want a drop bottom, this is the car for your job.

LOWER COSTS!

If your war-worn rolling stock needs replacement for the competitive days ahead — a.c.f. has the right car for your operation. This equipment will serve you well and *economically* for many years of hard usage. We have small capacity cars and also eight wheel cars with either through axle trucks or caster truck design.



a.c.f. 8-WHEEL LARGE CAPACITY CAR

This ten ton (or larger) railroad type car can take curves below a 16 foot radius because through axles keep the trucks true to gauge and because each a.c.f. special chilled wheel is equipped with modern anti-friction bearings. The wheels operate independently — with no slipping or sliding on shortest curves. This car is designed to do the job.

a.c.f.

AMERICAN CAR AND FOUNDRY COMPANY

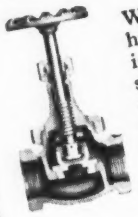
NEW YORK • ST. LOUIS • CHICAGO • PHILADELPHIA
BERWICK, PA. • PITTSBURGH • CLEVELAND • HUNTINGTON, W. VA

FIT THE VALVE TO THE SERVICE

WHERE THROTTLING IS NOT REQUIRED

Walworth No. 95 Re-New-Disc Bronze Globe Valve saves time and trouble in changing discs because of the lock-on, slip-off disc holder originated by Walworth. It's an ideal globe valve for use where throttling is not required. General purpose discs are regularly furnished, and special discs are available for unusual services.

WHERE THROTTLING IS REQUIRED



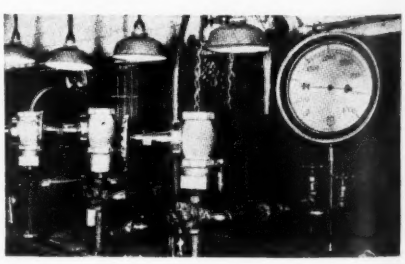
Walworth No. 245P, with its hard plug type disc and seat, is designed for throttling service. It resists "wire drawing" and lasts longer. Like the No. 95, extra strength in the body-to-bonnet connection is obtained by the union bonnet design.

WALWORTH BRONZE VALVES

Walworth No. 95 and Walworth No. 245P are two excellent valves for general service. They are representative of Walworth's complete line of bronze valves, and are well designed, made to precision standards, and proved in the services for which they are recommended. They are engineered for specific purposes . . . No. 95 for general service, No. 245P for throttling service . . . and each has its distinctive features of design and construction.

Walworth manufactures a complete line of valves and fittings in steel, iron, and bronze, as well as three types of pipe wrenches. For full details on Walworth products write, on your company letterhead, for a free copy of Catalog 42, or see your Walworth distributor.

TESTING SEATS OF BRONZE VALVES



Assembled Walworth bronze valves are subjected to test under pressure – either air-under-water, steam or hydraulic. The hydraulic seat test is shown here. Walworth Quality Bronze Valves undergo a hydrostatic shell test of three times their rated working steam pressures.

Rigid testing, strict laboratory supervision of materials, and continuous inspection of manufacturing operations, help to make all Walworth products "fit the service" for which they are recommended.

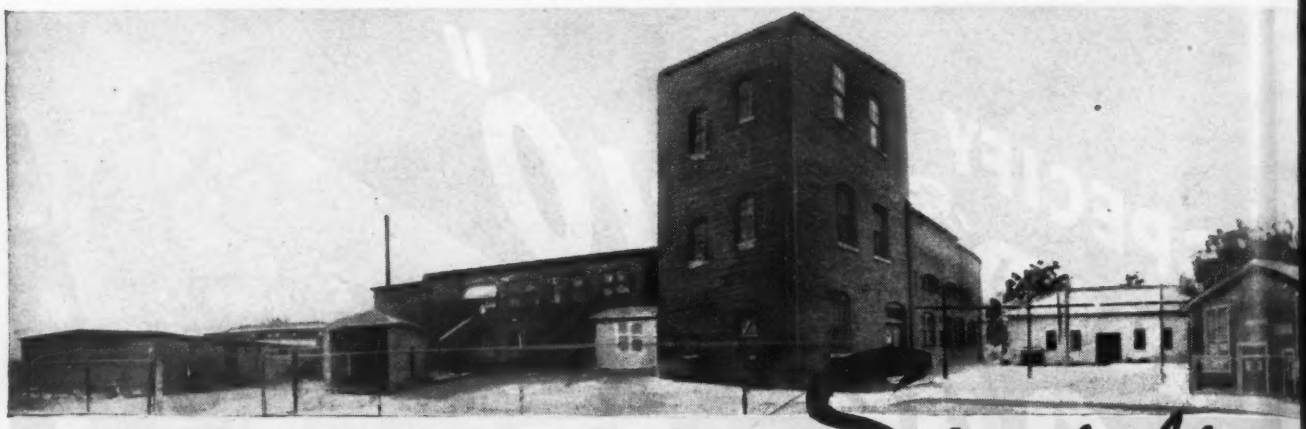
ARMY-NAVY "E" ARMY-NAVY "E"

BOSTON WORKS
KEWANEE WORKS

WALWORTH
valves AND fittings
60 EAST 42nd ST., NEW YORK 17, N.Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORL

SPECIFY GOODYEAR "COAL-FLO"
to get the coal industry's first-choice conveyor belting
Remember that name—"Coal-Flo." It is Goodyear's new designation for its time-proved line of conveyor belts that hold world tonnage records in handling both anthracite and bituminous. Mine records prove Goodyear "Coal-Flo" belts "flow" out more coal—last years longer—require less maintenance—are far more resistant to edge wear, cutting, stripping and mildew-rot—for four exclusive reasons that insure lowest cost-per-ton service. To get the full story, call in the G.T.M.—Goodyear Technical Man—or write Goodyear, Akron 16, Ohio or Los Angeles 54, California.
★ BUY WAR BONDS · BUY FOR KEEPS ★
"Coal-Flo"—T.M. The Goodyear Tire & Rubber Company
GOODYEAR INDUSTRIAL RUBBER PRODUCTS
GTM
-Specified "COAL-FLO" CONVEYOR BELTING
1—Extra-tough cover for handling gob
2—Skim coating between plies
3—Breaker enclosing edges
4—Mildew-inhibiting friction
GOODYEAR
THE GREATEST NAME IN RUBBER



KOEHLER *Specializes*

WHEAT ELECTRIC CAP LAMP

KOEHLER FLAME SAFETY LAMP

WHEAT LAMP SALES, Inc.

R. M. LAMBIE, PRESIDENT
1501 KANAWHA VALLEY BLDG.
PHONE 24-532
CHARLESTON, W. VA.

Nov. 14 1944

Mining Industry
U. S. A.

Gentlemen:

Re: Approved Electric Cap Lamps

Recent developments in this field might indicate less competition in the future.

Koehler Manufacturing Company is one of the strong companies left in the mine lighting field whose electric cap lamps have had wide acceptance. There should be, and will continue to be, active competition in such an important field. We believe that the Koehler Manufacturing Company, makers of the Wheat Approved Electric Cap Lamp for over 25 years, and the Koehler Approved Flame Safety Lamp for over 30 years, has earned your confidence. Sales have increased each year and lamps outstanding have more than doubled in the past five years.

Many of our Wheat Lamps have been in service for two decades with lighting efficiency increased through improved replacement parts.

Over the years our new models have set the pace for sustained illumination, light weight and low cost.

In view of these facts we are respectfully asking you to give us an opportunity to present the Wheat Lamp for your consideration, before you decide to make any changes or commitments in your mine lighting requirements.

With your help, we will continue to contribute vigorous, respectful and progressive competition in this field.

Your's for Improved Mine Lighting with Safety,

WHEAT LAMP SALES, INC.

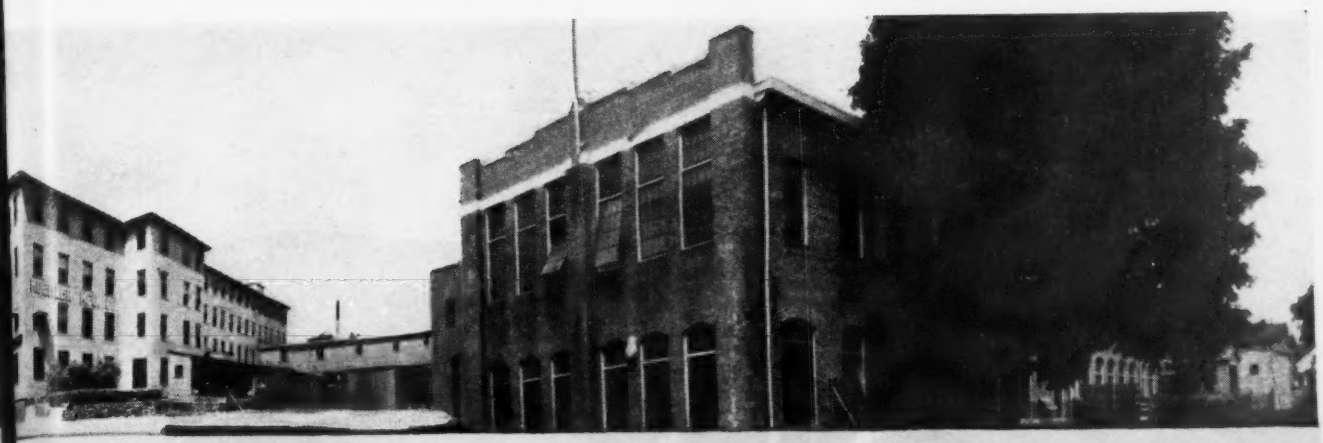
BY: R. M. Lambie
President

One company with

Write today

WHEAT LAMP SALES, INC.

1501 Kanawha Valley Bldg., Charleston, W. Va.



EXCLUSIVELY IN MINE LIGHTING

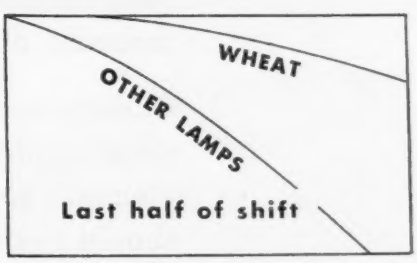
WHEAT

The Approved Cap Lamp

The light that is bright at the End of the Shift

Exclusive

in that our interests in this field have always been devoted entirely and solely to the further development of better and safer mine lighting. To do one thing superlatively well is the basic philosophy which has dominated our thinking for over 30 years.



Wheat burn brighter at end of shift

with a single purpose—**BETTER MINE LIGHTING**

SPECIALISTS IN MINE LIGHTING FOR 30 YEARS

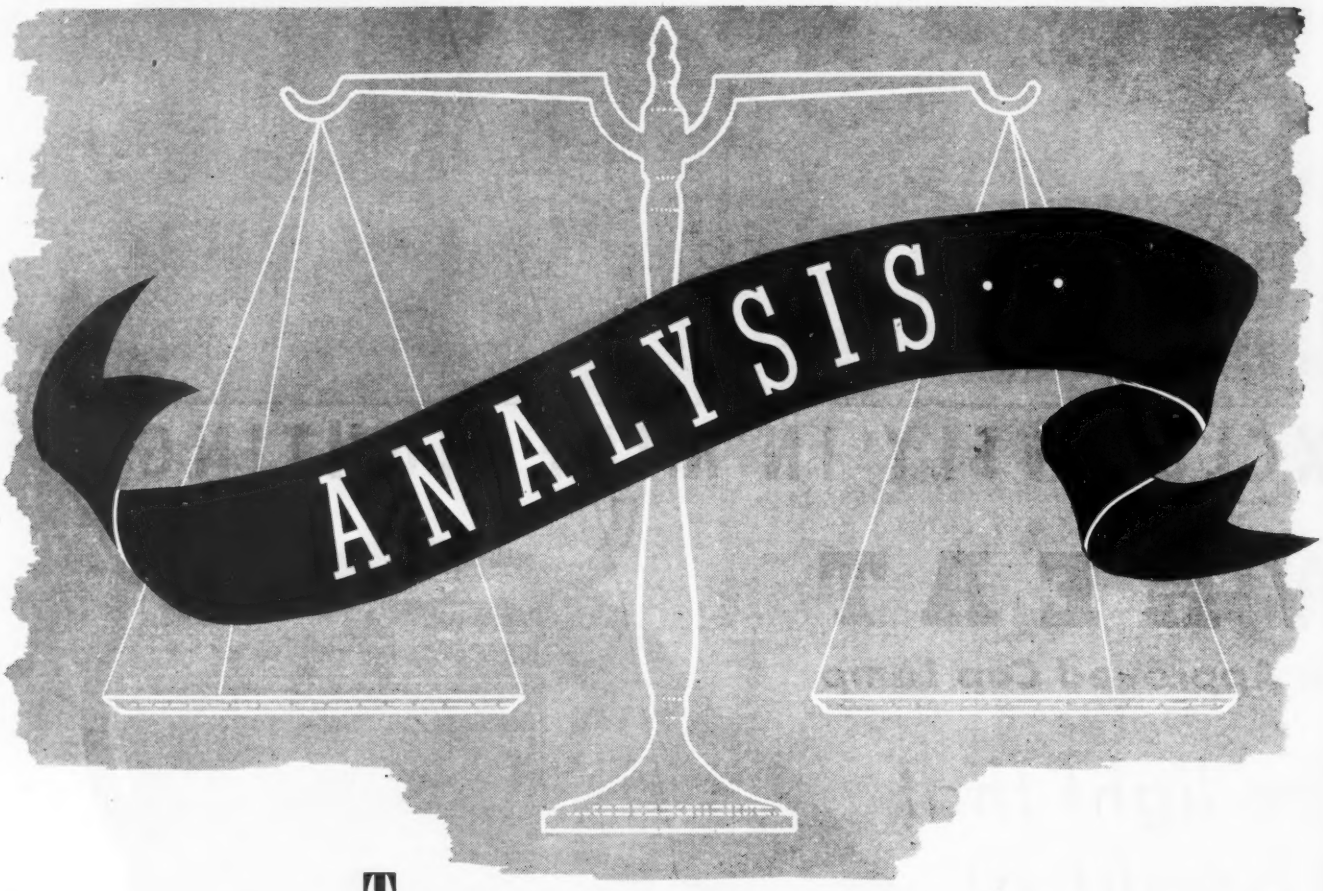
KOEHLER MFG. CO.

Marlboro • • • Mass.

Eastern U. S. A.:
WHEAT LAMP SALES INC., Charleston, W. Va.
Western U. S. A.:
E. D. BULLARD CO., San Francisco, Cal.

Eastern Canada:
H. C. BURTON & Co., Hamilton, Ontario
British Columbia:
B. C. EQUIPMENT CO., LTD., Vancouver, B. C.

BETTER LIGHT - LESS WEIGHT
NON-SPILLABLE



THE ability to analyze all the factors affecting an operating problem is an important consideration in the evaluation of an engineer.

Doctors call it "diagnosis"; the working man would be more likely to say, "sizing up the situation"; but whichever term you prefer, the consulting engineer must have analytical ability. And the degree to which he *has* that ability is an important measure of his value as engineer.

Underground costs — above ground costs — marketing objectives — utilization consideration — all these and many other elements come in for careful analysis. None of these elements should be given a disproportionate value to satisfy the desires of any particular manufacturer of equipment. The customer's best interests *must* be the sole restriction.

Allen & Garcia Company, operating for the client on a fixed fee basis, offers an experienced staff of analysts. May we "size-up" *your* situation?

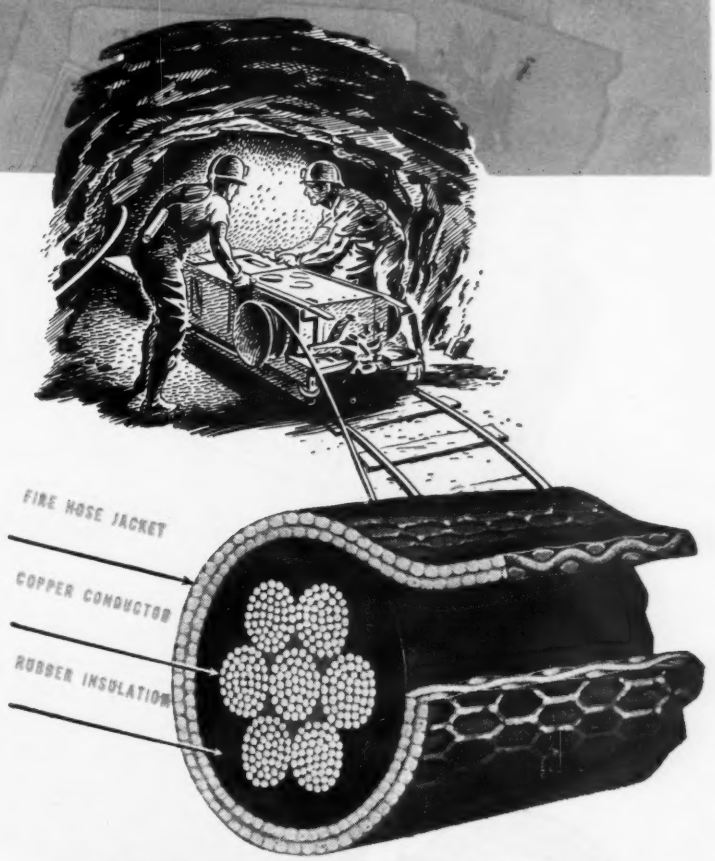
ALLEN & GARCIA COMPANY

CONSULTING AND CONSTRUCTING ENGINEERS

332 S. MICHIGAN AVE., CHICAGO, ILL. • 120 WALL ST., NEW YORK, N. Y.

Fire-hose-jacketed Duracord

ONE OF THE TOUGHEST, PORTABLE CABLES YOU EVER LAID DOWN IN A TUNNEL



DEVELOPED 25 years ago, Duracord has been time-tested and proved under the toughest conditions. The fact that it saves rubber in mining cable is only one of its present advantages.

Duracord is extra tough because it is covered with a Fire-hose Jacket.

This covering is *woven—not braided* . . . an important difference when it comes to strength and toughness. And it is imbedded in the belt, for extra tensile strength.

Duracord is *flexible*—easy to handle.

Duracord is engineered by mining cable specialists and quality-controlled from "raw material to finished cable."

Duracord is giving stand-out service in countless tough operations. More information on request from any of our sales offices.

44248

ANACONDA WIRE & CABLE COMPANY
Subsidiary of Anaconda Copper Mining Company
General Offices: 25 Broadway, New York 4
Chicago Office: 20 North Wacker Drive 6
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Anaconda Wire & Cable Co.

TYCOL INDUSTRIAL

SCIENTIFICALLY ENGINEERED FOR

Summed up!

BE SURE TO MAIL THE COUPON FOR YOUR FREE COPY OF THIS INFORMATIVE LUBRICATION HANDBOOK

★ *How is the Carbon Residue of a lubricant determined?*

★ *What is the significance of a lubricant's Neutralization Number?*

★ *What means are employed to determine Flash Point?*

To get concise, understandable answers to these and other questions about lubricants, send for a free copy of the new edition of "Tide Water Lubricania". This 20-page illustrated booklet gives graphic explanations of the methods and equipment used to determine specific qualities of lubricants — Viscosity, Pour Point, Penetration and other important properties.

Even more helpful — the booklet explains briefly the significance of each property as it affects the performance of lubricants in specific services. Every user and buyer of lubricants will find this information particularly helpful as a guide to choosing the right type of lubricant for each requirement.

Since the terminology and test methods described are universally accepted, the information given in "Tide Water Lubricania" can be applied to all lubricants regardless of make. Thus the booklet makes a permanently useful addition to your lubricant specification files. Be sure to mail the coupon today for your free copy of this useful lubricant guide.

• • •

Tide Water lubrication experts are completely familiar with all phases of lubricant production and application. They know that the "Lubricania" tests are rigidly followed to build and maintain the high quality of Tycol Oils and Greases — quality lubricants scientifically engineered to meet every industrial use. Let a Tide Water engineer put that lubricant knowledge to work in your behalf. Write to your nearest Tide Water office for further information.

TIDE WATER ASSOCIATED OIL COMPANY

MAKERS OF THE FAMOUS VEEDOL MOTOR OIL • Eastern Division: 17 Battery Place, New York 4, N. Y.

Principal Branch Offices: Boston, Philadelphia, Pittsburgh, Charlotte, N. C.

DRUMS! DRUMS! DRUMS!

War needs make it extremely important that all empty drums be returned immediately

LUBRICANTS
EVERY INDUSTRIAL USE

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TIDE WATER ASSOCIATED OIL COMPANY
17 Battery Place, New York 4, N. Y.

Please send me a free copy of the latest edition of your illustrated booklet "Tide Water Lubricania."

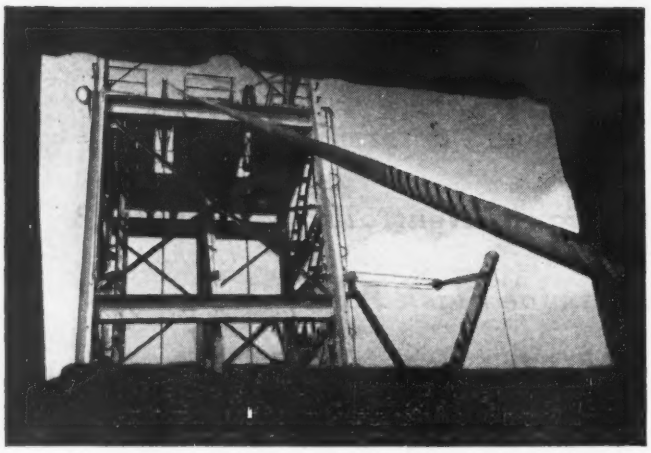
Name_____

Company_____

Address_____

City_____ State_____

There's a BETHLEHEM WIRE ROPE for every job around the mine



Need Shaft Rope? Something big to handle heavy loads in shaft hoists? The making of such a rope requires careful consideration of depth, load, and changes of speed. Your shaft rope must have the proper strength and the proper "give." Above all else in this service, you need a rope that's dependable. *Bethlehem makes it.*

Rope for Slopes or Incline Planes? You'll probably want a coarse outer-wire construction so that the rope will best withstand slapping and abrasion as well as the friction that occurs from contact with rollers, ties, and stones. You'll want a rope that doesn't wear out easily in this tough service. *Bethlehem makes it.*

Machine-Feed Ropes? On many mining machines, the wire rope must pass around small sheaves; must be built to take sharp bends and turns. In applications of this sort, Form-Set (preformed) rope is recommended. Because of its high resistance to bending fatigue, it's longer-lived. And it's easy to handle, too . . . an important consideration in close, cramped quarters. Where flexibility is a major consideration, specify Form-Set. *Bethlehem makes it.*

Ask your Bethlehem representative for information on these and other types of mining ropes. He knows the game, and he'll talk your language.

Morrow COAL TIPPLES

COAL HANDLING EQUIPMENT

Complete

COAL TIPPLES
and COAL HANDLING
Equipment

Car Hauls • Dumps • Weigh-Pans • Feeders • Conveyors • Elevators • Shaking Screens • Vibrating Screens • Picking Tables • Loading Booms • Car Retarders • Coal Washers • Steel Structures • Bins and Bin Gates • Perforated Metal Screens • Flanged Lip Screens • Sand and Gravel Equipment

Modernization of your operations NOW . . . will enable you to successfully meet the keen, cost-conscious postwar coal markets. Morrow engineers have the advanced "KNOW-HOW" for designing and building dependable equipment that will help you to reduce labor, maintenance and production costs . . . thus enabling you to keep your operations PROFITABLE.

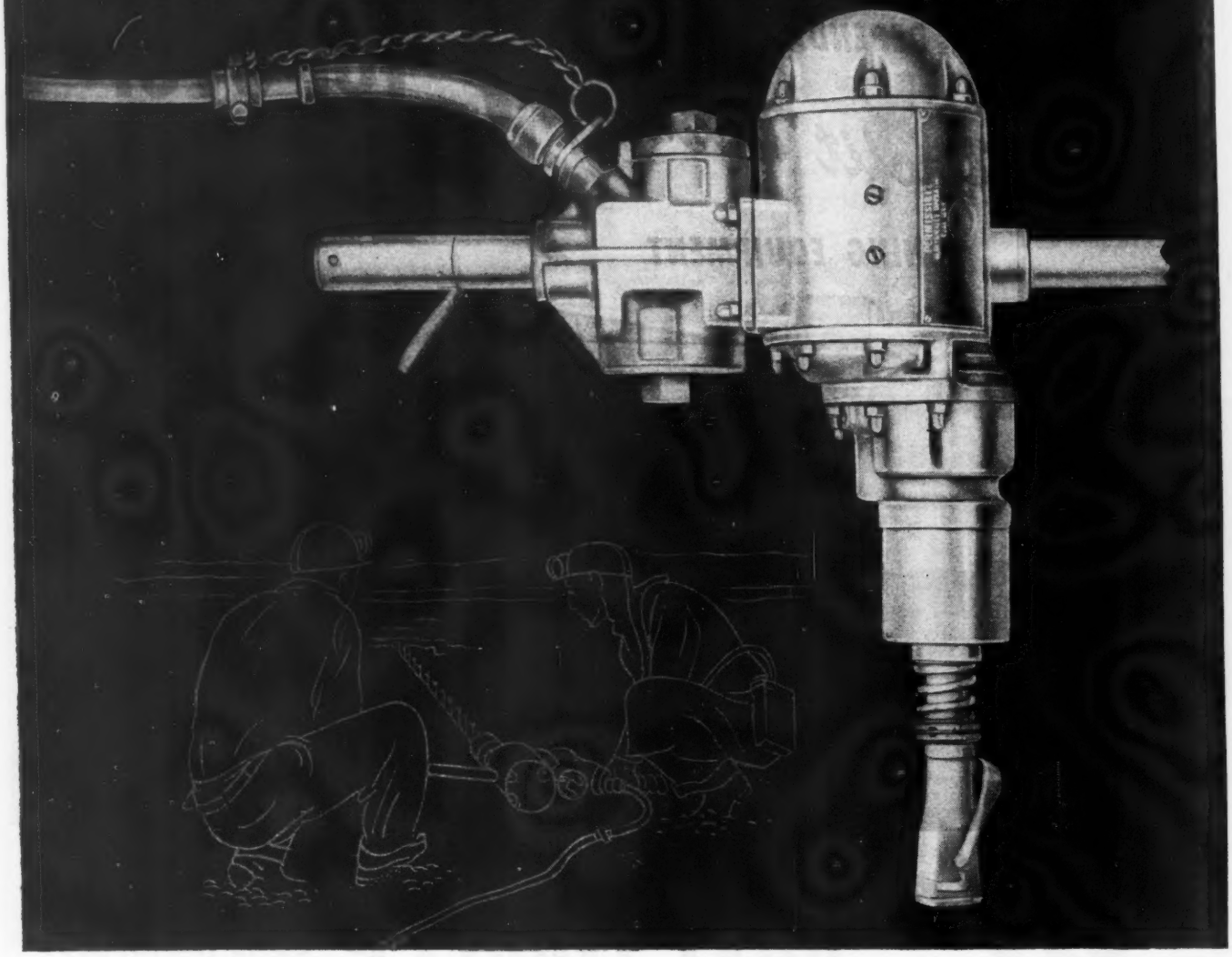
Morrow engineers are available for consultation anywhere, anytime, without obligation.

MORROW

MANUFACTURING COMPANY
DIVISION THE WACKER CORPORATION
Wellston, Ohio

DESIGNERS AND BUILDERS OF COAL HANDLING EQUIPMENT FOR OVER 25 YEARS

112 holes in 14 hours



CP No. 572 Permissible Hand-Held Coal Drills

CP No. 572 Permissible Electric Coal Drills with Safety Clutch, in the difficult drilling Alma seam, are performing regularly at the rate of 112 holes, 2¼" diameter by 7 feet deep, for each day of two seven-hour shifts. Drilling time ranges from 1 minute, 10 seconds, to a maximum of 1 minute, 30 seconds, per hole.

CP design features include unusual accessibility for examination of parts, light weight, and a safety clutch for release in case an auger sticks — a valuable protective feature for the operators and motor. Write for Catalog 902.

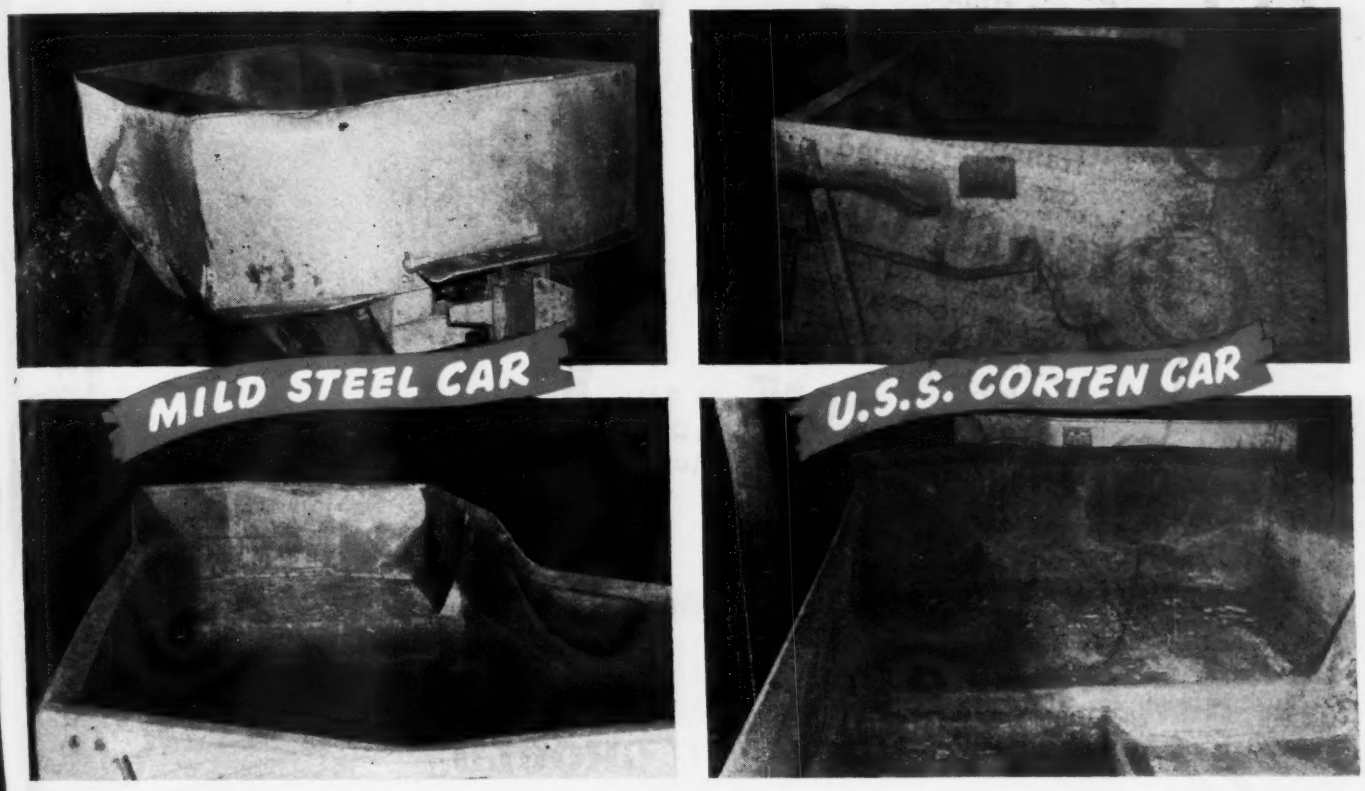
CP offers the largest line of Hand-Held and Post-Mounted electric coal drills: five sizes of the Hand-Held type; and four sizes of the Post-Mounted type.

★★★★★★★★★
PNEUMATIC TOOLS
ELECTRIC TOOLS
HYDRAULIC TOOLS
ROCK DRILLS

CHICAGO PNEUMATIC
TOOL COMPANY
General Offices: 8 East 44th Street, New York 17, N. Y.

★★★★★★★★★
AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES

Two cars caught in 41-ton roof fall show *Superior strength of* COR-TEN



A CHANCE like this to make an actual comparison of car strength happens once in a blue moon.

When a solid chunk of slate, 2 feet thick, 8 feet wide and 57 feet long, crashed on a trip of four empty cars, two cars of identical design—one of COR-TEN and one of mild steel—were in the middle of the fall and received the brunt of the impact.

According to the mine superintendent both cars took an equal beating—but with entirely different results.

Pictures at left show what happened to the mild steel car. It did not fail but one side is badly buckled and bulges out a full 8 inches. The other side, and one end too, are bent out of line. Because it could not be handled by the rotary dump, this car had to be removed from service and will require extensive repairs.

In contrast, the COR-TEN car has only a slight bow on one side and one end. Except for a broken coupler, the car is perfectly usable and can be put back into service without further repairs.

We have showed these pictures to a number of operators. Said one of them "This is certainly an eye opener to me. I've always thought of COR-TEN as a steel that would increase life in mine cars because of its much greater resistance to corrosion. But this gives me quite a different idea of what COR-TEN's extra strength can do to add stamina to our equipment."

COR-TEN is back again!

For the past four years COR-TEN has been devoted exclusively to war applications. Today it is again available to give your cars greater strength and stamina, greater resistance to atmospheric corrosive conditions or to save weight. COR-TEN costs so little extra to use that you can't afford to overlook its proven benefits. We'll be glad to show you how COR-TEN can be applied to your equipment to insure greatest efficiency and economy.

AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York*
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
NATIONAL TUBE COMPANY, *Pittsburgh*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*
United States Steel Export Company, New York
United States Steel Supply Company, Chicago, *Warehouse Distributors*

USS

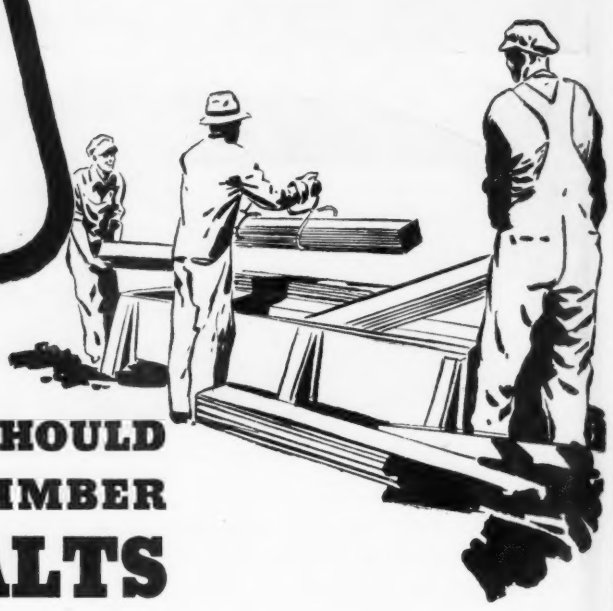
UNITED STATES STEEL

1 **LOWER COST...** because you use native green timber.

2 **LOWER COST...** because handling and transportation costs are greatly reduced.

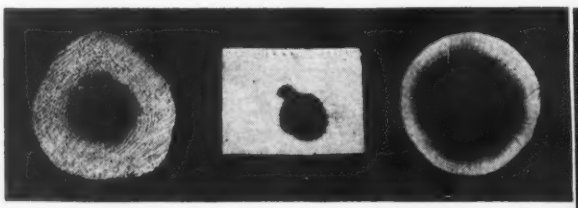
3 **LOWER COST...** because no special, expensive equipment or heating apparatus is needed.

4 **LOWER COST...** because it can be applied with any unskilled labor.



4 REASONS WHY YOU SHOULD TREAT YOUR OWN TIMBER WITH OSMOSALTS

Those four reasons will save you a lot of money and headaches. This is not idle statement, but the proven experience of mines which are successfully treating their timbers with OSMOSALTS. Generally their source of supply is standing timber on their own property. In addition to the savings effected, they obtain dry, clean, odorless treated timbers which are safe and easy to handle. Write today for all the facts.



Illustrated above are cross sections of three kinds of timbers. The white outer areas, which have been subjected to standard color reagent tests, show the deep penetration of the toxic chemicals in Osmosalts.

OSMOSALTS

Nature's Method of Wood Preservation

MANUFACTURED BY

OSMOSE WOOD PRESERVING COMPANY OF AMERICA, INC.

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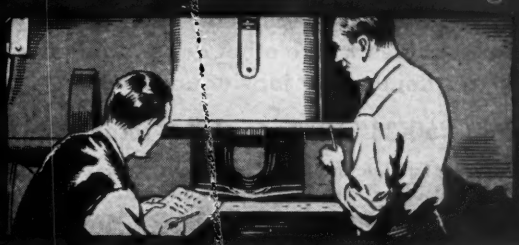
That's our unofficial way of referring to the "impact test" we give U.S. Royal Cords and Cables. A 27½ pound steel hammer, with a 1 inch diameter impact foot, falling 7 inches... repeatedly smacks the cable for as many as two thousand times without cable failure.

Not only that, but we also punish "U. S." Royal Cable with heat, cold, compression, stretch and bend—so that when we get through we know we've got a cable that will take all you can give it, and *more*, in actual use.

That is why Mine Operators and Locomotive Designers can specify U. S. Royal Mining Machine and Locomotive Cables with *absolute* confidence whenever they want a balanced cable construction, flexibility, high dielectric strength, smoothness of finish, and long trouble-free service.



THE NEW
U. S. ROYAL
Safety Tested
MINING MACHINE AND
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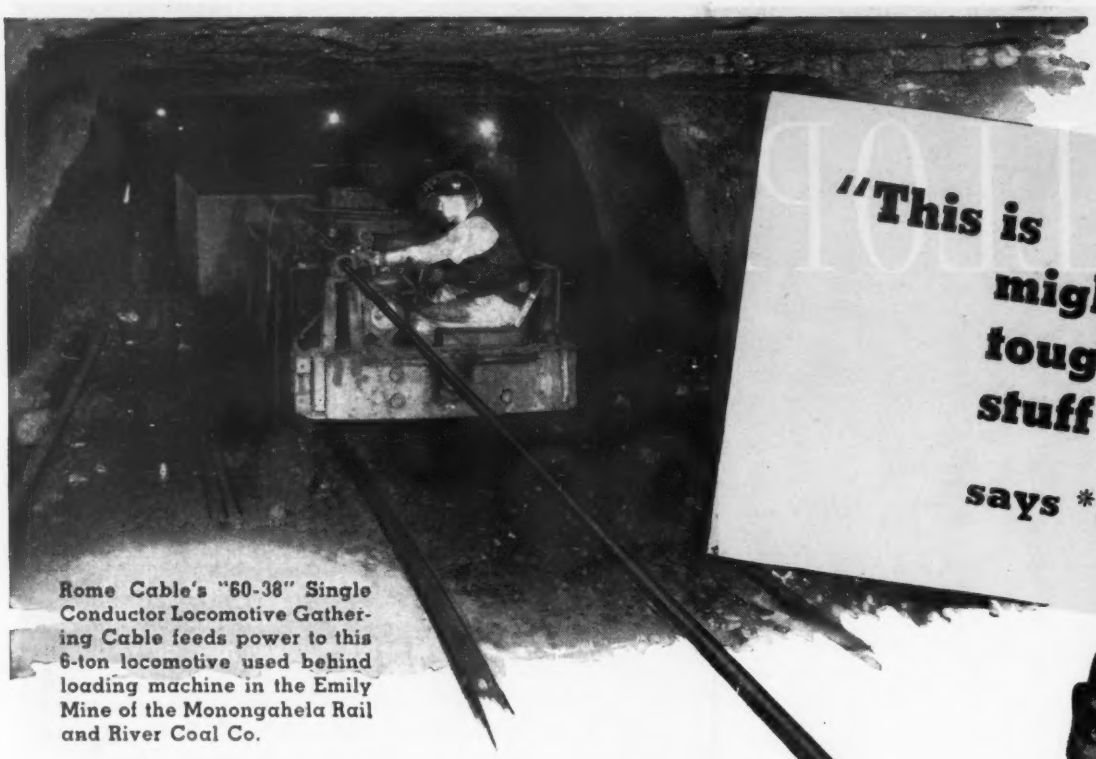
SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

1230 Sixth Avenue · Rockefeller Center · New York 20, N. Y. · *In Canada:* Dominion Rubber Co., Ltd.



Rome Cable's "60-38" Single Conductor Locomotive Gathering Cable feeds power to this 6-ton locomotive used behind loading machine in the Emily Mine of the Monongahela Rail and River Coal Co.

"This is mighty tough stuff" says *Romey

*Copr. 1944 RCC

To do the toughest, roughest job in the mine—and do it well—a locomotive gathering cable must take it on the chin day and night, and stand the gaff for months and months of uninterrupted service. . . It's a job that Rome Cable's famous "60-38" has been picked to do in many mines—mines where other dependable Rome Cable products are doing their jobs equally well.

Rome's "60-38" Single Conductor Locomotive Gathering Cable

The ideal Locomotive Cable with complete adhesion between copper conductor and the insulation. It is protected overall with a tough Neoprene jacket. This cable is recommended for electric locomotives of the gathering reel type or any other service requiring a flexible, heavy duty portable cable, where extreme adhesion of the insulation to the conductor is desired.

THE CONDUCTOR is composed of rope stranded, tinned copper wires. The individual ropes are laid up in a special manner to resist both tension and torsion.

A SPECIAL INSULATION is used, which has high electrical qualities and extreme adhesion to copper conductor, which prevents separation of the conductor from the jacket.

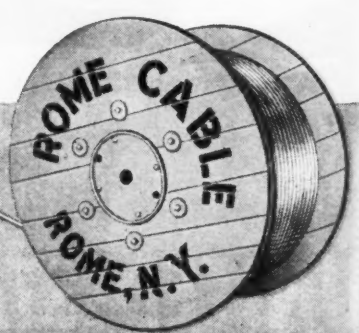
HEAVY TWINE REINFORCEMENT CORDS are applied over insulation to strengthen the cable and control adhesion between insulation and jacket.

THE NEOPRENE JACKET is vulcanized in continuous lead molds and has a high tensile strength, maximum resistance to tearing and abrasion, and long aging characteristics.

FROM BAR TO FINISHED WIRE

ROME CABLE CORPORATION

ROME • NEW YORK

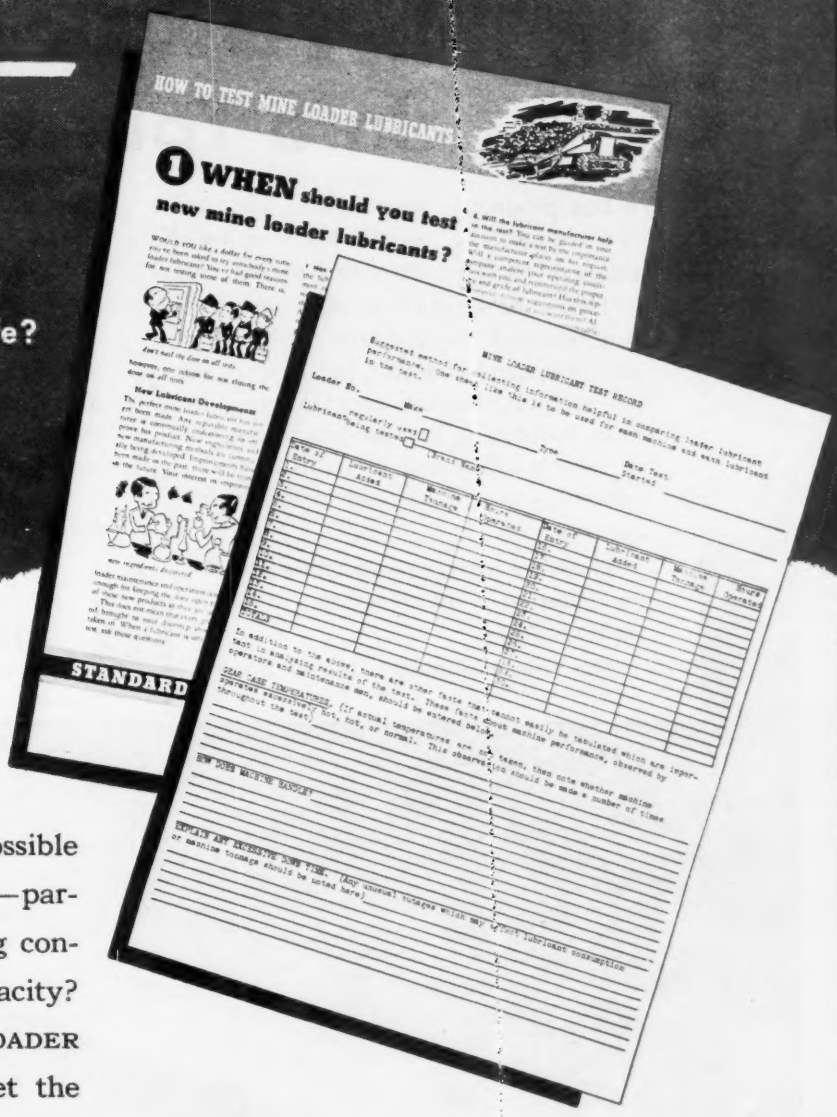


Is your mine loader lubricant giving you—

1 The greatest possible amount of productive loader time?

2 The longest possible lubricant life?

3 The least amount of wear, maintenance, and down time?


HOW TO TEST MINE LOADER LUBRICANTS
1 WHEN should you test new mine loader lubricants?
STANDARD
MINE LOADER LUBRICANT TEST RECORD

• You'd like to answer "yes" to all of these questions. Wouldn't you like to make sure you are getting all possible loader time, and lowest maintenance—particularly under present day operating conditions when loaders are pushed to capacity?

The folder, "HOW TO TEST MINE LOADER LUBRICANTS," suggests a way to get the right answer. It briefly describes when and how to test mine loader lubricants. It includes a sample form for making such a test. It tells why one of the seven grades of Superla Mine Loader Lubricants may prove to be the answer to your loader lubricating problem.

A copy or copies of the folder will be sent promptly at your request. Write Standard Oil Company (Indiana) office, 910 South Michigan Avenue, Chicago 80, Illinois.

Gasoline Powers the Attack . . . Don't Waste a Drop!

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

★ LUBRICATION ENGINEERING

Fit This "POWER PACKAGE" Into Your Work

• FOR productive strip mining, the tractor "power package" for the job must be efficient, dependable, easy to handle.

That's the kind of power you get with International TracTracTors equipped with the right size bulldozers, bullgraders, shovels, scrapers, loaders, etc. On every job—from bulldozing overburden to the building and maintaining of roads around the mine—these tractors turn in top performance records.

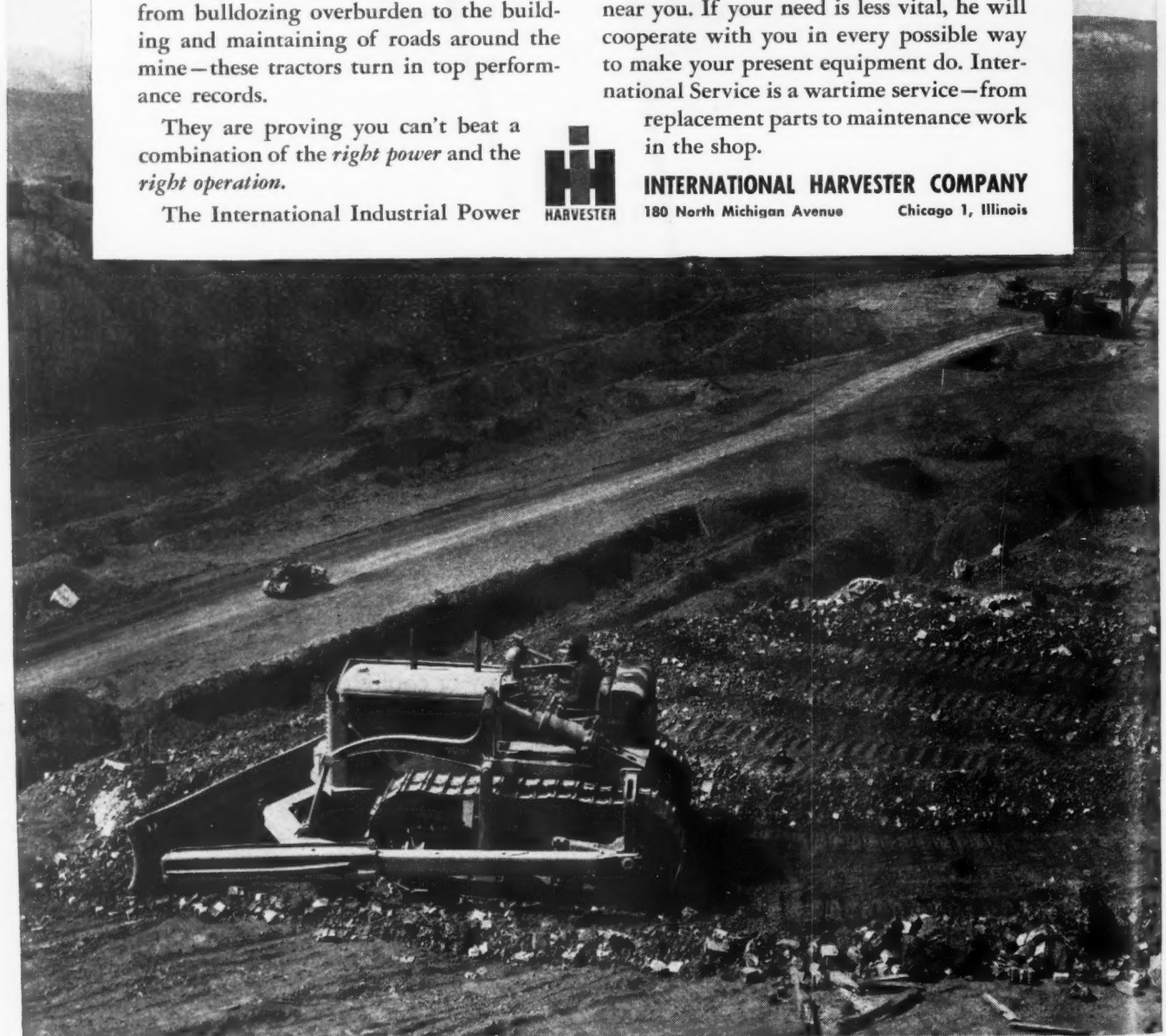
They are proving you can't beat a combination of the *right power* and the *right operation.*

The International Industrial Power Distributor can help you put those two things together. He can analyze your requirements, recommend the right power, and suggest helpful ways for you to get the most out of your equipment.

If you need new equipment to mine coal for the war, see the International distributor near you. If your need is less vital, he will cooperate with you in every possible way to make your present equipment do. International Service is a wartime service—from replacement parts to maintenance work in the shop.

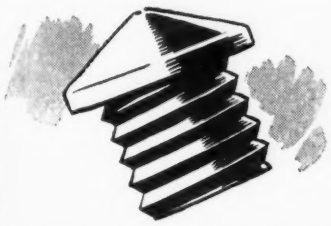
HARVESTER

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

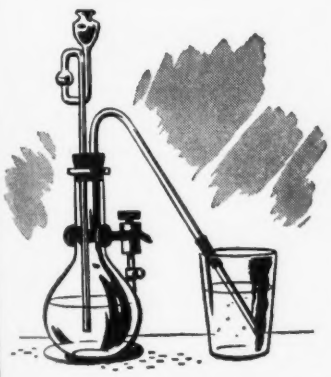


INTERNATIONAL HARVESTER
Power for Victory . . . Power for Peace

Typical of the exhaustive field tests which marked the development of the modern, high speed Cummins Diesel, was the gruelling 14-day grind which came to an end on Christmas Day, 1932, at the Indianapolis Speedway. Here, under AAA supervision, a Cummins-powered Indiana truck set a non-stop distance record for trucks: 14,600 miles (5,840 laps of the 2½-mile oval!).



The injector cup wiper is an inconspicuous part of the Cummins Diesel, but its development made a conspicuous contribution to the Cummins Diesel's efficient and economical performance. This patented cup wiper, perfected only after countless modifications in piston design, eliminates carbon on the injector cup, creates additional turbulency, assures more complete combustion.



Metallurgy plays an important role in the Cummins Diesel trend to ever lighter, stronger construction. Example: 5,000 samples were analyzed in selecting the cast iron for the block—a foundry was rebuilt and its methods completely revised—but the increase in tensile strength from 20,000 to 50,000 pounds per square inch more than justified the cost.

CUMMINS DEPENDABLE DIESELS

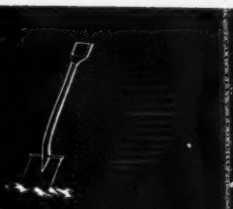
Automotive Models: Designed for all types of heavy-duty trucks in either highway or off-the-highway service.

★ ★ ★

Industrial Models: Portable and stationary engines, power units, and generating sets for service in any industry requiring heavy-duty power.

★ ★ ★

Marine Models: Propulsion engines and marine type generating sets designed for all types of fishing boats, work boats, and pleasure craft.



Spade Work

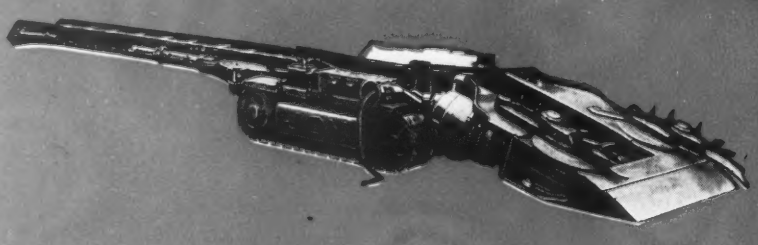
The diesel's higher thermal efficiency was proved many years ago . . . but it took the builders of Cummins Diesels to prove that diesel engine weights and dimensions could be brought within practicable limits. They proved it in 1932 with the original high speed diesel . . . proved it after 14 years of intensive "spade work" in the refinement of lubrication, cooling, metallurgy and many other aspects of design and construction . . . proved it by putting diesels in equipment and on jobs where diesels had never worked before. Today, you will find diesels in virtually every automotive, industrial, and marine service that requires heavy-duty power . . . and if you look closely enough, you'll find a very large proportion of those diesels are Cummins Dependable Diesels.

CUMMINS ENGINE COMPANY, INC., Columbus, Ind.

JOY 14 BU LOADER

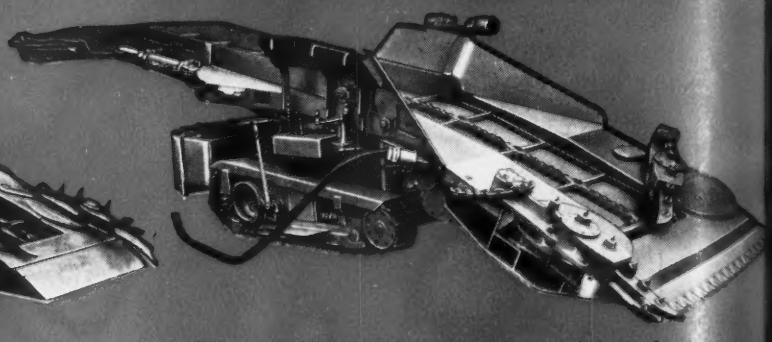
The powerful, strong, individual gathering arms are the real feature, and the secret of the success of this dependable, fast loading equipment. Fully automatic, electric control for the arms, caterpillar treads and conveyor is a feature of this 36" high, rugged, heavy duty machine. Loads up to five tons per minute.

IN LOW SEAMS



Where coal veins run very low, the Joy Junior Loader can accomplish wonders. Its efficient, smoothly operating chain conveyor is particularly adapted to loading on conveyors and can be turned at an angle in either direction if necessary.

FOR HARD ROCK



The use of Joy Loaders is not limited to coal mines alone . . . although that has been their greatest field of application. The Joy 11 BU Hard Rock Loader pictured above is a standard model with changes for working hard rock and ore mines.

STRESS TESTED

to exert a digging force of

5300 POUNDS

Your fullest protection against operational failure

JOY LOADERS *are engineered correctly to meet any requirement of the job!*

This test for gathering arm strength is only one of the many Joy engineering safeguards which constantly check each step in the construction details of all Joy Mechanized Mining Equipment.

Following through from the time skilled workmen begin to machine the parts for each loader, Joy Engineers are always on the job to see that each unit is living up to that Joy tradition of service.

JOY LOADERS *are designed for quick, efficient servicing under all conditions!*

Just to know that it is a good piece of equipment when it leaves the Joy factory is not enough. That equipment must withstand the rigors of actual service conditions and if it should need minor repairs, they must be able to be made quickly, on the job, with a minimum of "time out."

All these factors are considered in the designs of Joy Loaders and Shuttle Cars. That's why the experts say . . . "When the job is tough, work with Joy." For Joy dependability has been proved, under the most difficult working conditions, to do the work better, more quickly and economically.

JOY MANUFACTURING COMPANY

FRANKLIN, PENNA.

Consult a Joy Engineer

WHITE CHARTER OAK BRAND

The Safety Fuse for Damp Work

It is an excellent "general purpose" fuse, ideal for secondary blasting. Flexible, with a clean, hard white finish, it is suitable for damp work, and is very popular in strip pits.

If your work is dry or damp, you will find that White Charter Oak will meet your needs fully — and economically. For wet and very wet locations, however, a wax finish fuse may be indicated. Your explosives company is prepared to discuss your requirement with you and make recommendations — or you can write us.

Are you using the brand of Ensign-Bickford Safety Fuse best suited for your work? For instance:

If you have . . .	*and now use . . .*	*we suggest*
Very wet work	Double Tape Single Tape White Clover Beaver	Orange Wax Clover
Very wet work	Crescent	This is O.K.
Very wet work	Gray Charter Oak	Black Wax Charter Oak
Damp work	White Charter Oak	This is O.K.

22

ENSIGN-BICKFORD *Safety Fuse*

SINCE 1836
Also Primacord-Bickford Detonating Fuse

THE ENSIGN-BICKFORD COMPANY • SIMSBURY, CONNECTICUT

Coal Age

DEVOTED TO THE OPERATING, TECHNICAL AND BUSINESS PROBLEMS OF THE COAL-MINING INDUSTRY

Ivan A. Given, *Editor* **November, 1944**

March Approaches

MARCH and the start of the bituminous wage negotiations are only a little over three months away. These negotiations, and those for anthracite, undoubtedly will set the pattern for coal for some time to come. The question is: Is management ready to function efficiently in arriving at new agreements advancing the interests of the miners, the operators and the public?

Not to put too fine a point on it, the operators have shone none too brightly in the negotiations for the past several contracts. In fact, most of them have been made in effect if not actually by the government. Whether the result would have been different, of course, is speculative, but it is apparent first of all that the operators were handicapped by a cumbersome negotiating organization as compared to the one-man representation of the union. Secondly, as numerous operators have pointed out, splits in the management ranks largely destroyed ability to oppose effectively many undesirable proposals.

The operators again will be confronted by new demands next March. Several of these demands encroach still further on management's rights and function. As before, also, the operators will deal with one man with complete authority. It is apparent, therefore, that if they are to play their proper part in insuring the negotiation of fair and equitable agreements the operators should make sure that their negotiating organization is equally simple and flexible, that it has the requisite authority and that every step is taken to insure a "good press."

Preparations for an improved negotiating set-up already are under way in some fields. It is work deserving of the active support of all operators. In this direction more than any other, perhaps, good organization and good public relations have an opportunity to render a real service in promoting the welfare of coal mining.

No Little Decision

WITH THE UNION, New Deal leaders and a majority of the operators in favor of federal regulation of bituminous coal prices and marketing practices, and with the head of the Republican party also indorsing the principle of legislation to promote stabilization, it might be assumed that the future outlook for bituminous coal is nothing but rosy. Nevertheless, there are one or two questions that might be asked: Has coal exhausted all the other possibilities of stabilizing its business? Is coal satisfied that the possible advantages of inviting the government part way in will outweigh the risk that later it may declare itself all the way in?

Experience has proved that once government gets a foothold it seldom is content to go no farther. That it might, therefore, is a risk that must be assumed in submitting to or inviting partial control, and anything that can be done to minimize that risk should be done. Alternatives, consequently, should not be dismissed lightly. The sales-agency plan, for example, which had little chance to function before NRA swept the boards, still is considered to have real possibilities by many hard-headed operators. Then there is the possibility of measures for eliminating much of the overcapacity that has dogged coal prices for so many years. Before long, coal will be called upon again to make its decision. Since that decision may have far-reaching effects, all possible stabilization suggestions should have the most careful study. Only thus can coal be sure that the choice it will make will be the best one in the long run.

Still a Job to Do

WATER seemingly has an irresistible attraction for politicians. This, coupled with the New Deal's known hostility toward utilities, has resulted in a deluge of waterpower proposals in recent years—so many that it almost appears that every little drop is to have its own concrete cradle at the expense of the taxpayer. These proposals, incidentally, die hard. St. Lawrence, along with others, shows an astonishing ability to survive even the most pointed rejections, while new ones constantly pop up to swell the ranks of the hoary old timers.

Latest is the proposal for a Missouri Valley Authority, apparently to be modeled on the Tennessee Valley Authority even though there still is no evidence that TVA has accomplished benefits commensurate with the money poured into it. As to the proposed MVA, one authority — *Engineering News-Record* — states, among other things, that "there is no cheap and easily developed power" and that most of the factors cited as essential for the TVA set-up "are not to be found in the Missouri Valley." Six of the governors of the affected states have requested a less grandiose program more realistically related to the valley's needs and desires. Nevertheless, there probably will be plenty of support for an MVA, and coal again will need to lend its help in arriving at the truth about the power proposals.

WHAT 25 YEARS HAS MEANT IN

Coal-Miner Thinking

By WHITING WILLIAMS

The quarter century since World War I has witnessed great strides in the installation of machinery and improvement of working conditions in mines. Have equal strides been made in teamwork between miner and operator? To find out, Whiting Williams recently went back to the mine where he worked 25 years ago. His report throws additional light on one of coal's oldest problems.

I AM JUST FINISHING a week in the same bituminous coal town and down inside the same mine where, under an assumed name, I worked as a miner during May, 1919. Then nobody here except the superintendent knew that I was devoting six months to digging into the labor problem with a pick and shovel to hang onto my job as director of industrial relations in a Cleveland steel plant.

Several old-timers have recalled me as the bearded stranger about whom various citizens telephoned their suspicions to the management. I miss my hard-working but sprightly landlady who used to try in vain to shoo her four youngsters away from the single towel shared by her boarders. These sprouts, she was fond of saying, were "all I got left out of 15—and they was some mighty fine kids among 'em, too!" But the other townspeople generally have been interested in my return and glad to show me all the quarter-century's changes.

Harder to Start

The first difference—and somewhat disconcerting—was the multitude of insurance and other laws now governing employment which make it a costly chore for any employer to add a man to his payroll. Luckily, the "physical" and the bother of filling out the numerous forms for putting me on the job were sidestepped. Although technically not on the payroll I have been permitted to act almost as if I were.

For several mornings, accordingly, I've piled out of bed when the town's alarm clock—the tipple's great siren—sounded at 5 o'clock, gulped my breakfast, strapped on my electric lamp at the lamphouse, taken my place with the miners on the cage for the descent to the bottom, several hundred feet below, and then in one of the cars of the "man-trip" taken the three-mile ride to the working rooms "at the face." Alongside the section boss, I have walked and talked with the miners between enjoyment of snacks out of my dinner pail around 9:30 and again at noon. Finally, with weary legs, I have clambered back about 2:30 into one of the "man-trip's" cars, taken my place on the cage to be hoisted to the top, turned in my lamp and managed to get washed up for an appetizing supper at 5—quite content thereafter to do some easy loafing and chatting in the town and in the nearby city's saloons until bedtime around 9.

Impressive is the word for the physical improvements I have seen. If only the mental and social changes,

Against muscle in 1919, machinery in 1944 makes the miner's task easier, pleasanter and more profitable. But has his opinion of operators and the industry grown accordingly?

. . . but I'm getting ahead of myself.

Back in 1919 I sought work here because this "camp" was rightly considered much above average. Today it deserves the same preeminence. Pavements and sidewalks of concrete instead of mud and cinders now invite a host of shining autos and numberless bicycles. Lawns, porches, bathrooms, plumbing and electric lights are now universal. Thousands of trees and shrubs have long since been made to flourish along the various well-kept rows of homes between countless victory gardens. It is all crowned by the imposing new high school, which sits like a brooding hen atop the hill.

The old baseball lot is somewhat on the weedy side, but that is explained by the town's Honor Roll. Day and night the light shines bright upon the names of 900 boys gone off to war.

Altogether, though the old-timers still call it "the patch," it is an attractive place for useful work, comfortable living, and the hopeful rearing of an abundance of well-dressed, happy-looking children.

Quite as noticeable are the numerous improvements "inside." Down at the bottom of the shaft the "grand central station" is as brilliantly lighted and as amazing as before, with its whitewashed offices and shanties and its network of tracks. I saw nothing like it in the mines in Wales' Rhondda, North France's Lens district or Germany's Saar or Ruhr—all scenes of similar labors on my part since this one so astonished me back in '19. It is hard to believe that any pit anywhere could show better lighted or whiter and better rock-dusted main haulageways. Pure joy it would be to ride with some visiting operator from foreign parts behind the big new 36-ton twin-motor locomotive over the 60-lb. rails and behold his bulging eyes. Or to stand beside him as he watched the brand-new cutting and loading machines which do everything but talk as they fill car after car hurrying their precious loads away from sweatless, unwearied workers in well-ventilated and practically dustless working rooms. Or, further, to enjoy his amazement at the efficient teamwork of the shotfirer waiting to blow the great black cliff down as soon as the drillers had finished their holes for the powder or the machine loaders standing ready to go in the instant the explosion's smoke had cleared.

To date, the steel company operating this captive mine has only partly completed its program of mechanizing the many operations necessary above and below ground before the coal is finally loaded for shipment. As yet, it has built no cleaning plant for washing the coal sent up by the mechanical loaders, although it is high on the schedule. Oddly enough, there are no pithead baths at one of the tipples; these were taken out after the miners persisted in refusing to use them! It is hard to imagine better or more up-to-date equipment, the vein's condition and the company's program being what they are. As a result, the new slate dumps are pushing their gray-smoky points to the sky even faster than before, with spontaneous combustion kindling, as usual, the hidden fires which burn the refuse into the "red dog" later used on the district's roads. But neither the new nor the old slate dumps are allowed to encroach unduly upon the town. Hardly a view, therefore, from any of its streets across the

ABOUT THE AUTHOR

Whiting Williams, as the "bearded stranger" of 25 years ago faces the camera at the left. Minus the beard, he poses at the right in his mining kit on his return to the scene of his earlier labors. A believer in getting down to cases, as in the present investigation, Mr. Williams has been active in the field of better labor relations for more than a quarter of a century. He has worked in coal mines not only in the United States but in Wales, France and Germany. His intimate knowledge of industry, coupled with his broad background of experience in labor matters, especially qualify him to discuss one of coal's oldest problems.

cultivated fields and wooded hills but makes one exclaim: "How green is my valley!"

With above-ground conditions so favorable to better living and with such technological aids to greater output at the cost of vastly less than the former fatigue and sweat, what could keep the observer from delighting in ALL the changes?

To give the answer is a disagreeable task, especially for one who, ever since that six months in 1919, has tried to promote understanding and cooperation between employer and employee. For, beyond all doubt, the "camp's" state of mind is worse today than then.

It seemed unthinkable at first that the "super" and his foremen could be justified in feeling so unhappy about their workers' attitude and so completely hopeless as to its fairly early improvement ("we'd be glad to meet them more than half way; but it's simply impossible to satisfy them and still get out the coal. We can enforce practically no rules because we need every last pair of hands"). Unfortunately, their pessimism is supported by all those townspeople who as "innocent bystanders" are as close to management as to miner.

"A lot of them today are too arrogant for anybody to get along with," the usual testimony goes. "They make no pretense of fairness to the company, even though they all consider their bosses, little or big, individually honest and fair. Instead of any give and take, the mine committee wants only to take —take every conceivable advantage. The instant any little thing is refused them for any reason, out they come! On paydays many of them quit after hardly a half shift's work. And after payday absenteeism soars! It's hard to figure how some of them can walk past the Honor Roll without blushing for shame. All they seem to think of is their class war—against all employers! And anybody who talks too loudly of fairness is likely to wake up in the hospital!"

Worst of all, these "public" testimonies are confirmed by the local leaders of the miners themselves.

Not an Inch!

"If we give management an inch," several members of the pit committee told me at an evening's informal get-together, "they push us back a mile. So we fight 'em all the way and all the time. But it's a rich company and there's no danger of our busting it. Of course, they tell us we have to keep down the cost of coal to compete with other fuels. Nothin' but lies! All of us know, just as you probably know yourself, though most people don't, that practically all the gas used in our autos and the fuel oil burned in our factories and homes comes not from oil wells, as they claim, but instead from coal(!) 'Competitive fuels?' Nothin' but lies and bunk!"

Of the six committee members present, most of the talking was done by a Negro and a Russian-born immigrant, not by the chairman. I'm not sure they are as communistic as their reputations stamp them, nor that they are revolutionists. But they certainly are getting a big kick out of their particular sector of the class conflict. All the wickedness of the world today and of all history to date, they believe, is supplied by "the rich," particularly the big, rich business concerns.

"'Course you knows yourself that today the poor man can't get nowheres. With education? Yes. But it costs at least a thousand dollars to send your boy or girl to college, and what miner can afford that, when he's lucky if he earns that much for himself? Work his way through college? Yes, if his people are rich, but otherwise—well, I never heard of it! No, the only answer is to put everything under the control of government the way it is in Russia, where everybody now has a chance to get education! Before that, of course, we must break the power of the rich by fighting our bosses for every half inch we can get. And we'll never have no better chance than now. That's because, to win the war—*their* war, not ours; not us workin' men, y' understand—the bosses figure they must have every pound of coal they can force us to dig for 'em. Just now y' see, the whip's in OUR hands!"

From Chicago's Bughouse Square through London's Hyde Park Corner and Glasgow's Argyle Street to the muddy lanes of Russia's Don Basin coal towns, I've run into every conceivable variety of economic theory and revolutionary weirdness. But never have I heard in one session so many amazing economic fallacies nor seen them combined with such breath-taking efforts to save their proponent's personal "face."

"Work overtime? Not me! It makes my taxes too big. My wife and I ain't got no children. So the more I earn the more I get skinned! Why, if I made $500 a month, it wouldn't put me ahead one dime! Anyway, I didn't have no part in causing this war. So why should I help pay for

it? The rich caused it and they'll get the only benefit from it. So let 'em pay for it. No, I don't buy no war bonds.

"Take, for instance, my vacation money. Why should I pay taxes on that as part of my income? No sir, the Lord Himself wouldn't approve o' that. Besides, a lot of us have reason to believe that the company calls it *charity*, so they can get it deducted from *their* taxes. And this six-day week they figured out to get more coal for themselves and, so they said, more money for us. That's too much and too hard work. Anyway, everybody here knows that this mine produced more coal per man on the five-day week than on the six-day. Fact is, I know lots of miners—hand loaders that is—who'll get out their biggest production on a *four-day* week! Loadin' machines? Sure, they mean smaller pay but they're easier work and I'm for 'em, but only provided the company pays a man enough to give him a good living and also takes care of the four or five men he and his machine pushes off the job into starvation!"

Not Only Mining

And so, far into the night—at least it would have gone that far except that, unfortunately, the Russian's inborn love of philosophic speculation made him ask a question that switched the confab over to religion.

"What you think, Mr. What's-your-name," he queried, "for why does it have always to be so much pain in the world, from when it hurts our mothers to have us borned, and then without no fault of his, a baby has a bad hurtin' colic? Why is dat?"

The colored brother was quick with his answer: "Because the rich people . . ." The others laughed their unwillingness to go that far. But nobody set right the Russian's explanation that: "Of course, the Old Testament was written a long time ago. But you know the New Testament was written by King James in 1525." And nobody bothered to answer the Negro's amazing puzzler: "Just how did King James kill off 40 of his 72 Bible translators? Kill 'em? Sure, he must have. Because, you see, they's only 32 books in the whole Bible!"

It is hard to believe such spokesmen typical of all their fellow committeemen across the country. Whether they are or not would require too many months of listening to find out. But luckily the heads of their union disagree strongly with these local spokesmen, both as to government operation and also as to class conflict—and also, doubtless, as to annual pay totals in such a regular mine as this. It is unthinkable, also, that the national officers would agree with this local group's manifest conviction that any conceivable blow at management, however far below the belt, is completely justified by a conviction that the operators used a busted union and a scarcity of jobs to wield the whip before and into the early days of the Great Depression.

"In those days if we complained about anything the boss would tell us: 'Well, if you don't like it, you know damn well what you can do.' And if a jobless miner went down to the post-office, the guards would raise their big sticks and tell him: 'Get back to the patch, you, before you get hurt!' "

Why the Belligerence?

Is the committee's belligerence caused by the sense of power given by its union shop contract or merely by the wartime scarcity of men? More important, will there be a tendency to strike back if a possible postwar scarcity—not of men but of jobs—gives the operators an advantage? Will they be as anxious to "get even" as these committee members are now? If so, when can goodwill and cooperation be expected in this and other peaceful-looking coal valleys across the land?

That's hard to say. However, on the hopeful side, it may be said that it appears altogether likely that most of the town's miners want a return of friendlier relations. As a whole, the community demonstrates the American melting pot in constructive action, helped by the catalyst of national crisis. No League of Nations could hope for a more composite membership than is proclaimed by the Honor Roll's listing of—

McCann	Maccaroni	Malerbi
Mallory	Matekovich	Miller
Misko		Morgan

Hardly a home but displays its generous contribution to the fighting forces. And, down inside, hardly a father but manifests his solemn pride as he tells of his "T'ree boys in army, one in navy." Reasonable, loyal and lovable is what I'd say most of these people are.

"All time," one Slovak war-mother told me in her comfortable home, "I listen by radio and pray and cry; pray for war end to bring back our boy. From 'somewhere in France' he write now always two letter in week. 'Not'ing to write about now,' he say, 'but God bless you, dear Mother and Father,' he say. And every mont' forty dollar he send us. We save it all for buy heem auto when he come back!"

She and her "man," a highly respected craftsman, have, like many others here, sent their three daughters off for higher education and now see them married to a doctor, a lawyer, and a teacher. Not much "working class," or "class conflict," ideology in that. Or, for that matter, not much of the prodigality so typical of some of the coal fields. These people have saved to educate their children. On the other hand, it is true that many of the community's miners find it hard, apparently, to put aside much of the high earnings permitted by the present opportunity to work and earn every day (instead of the typical mine town's traditional curse of irregular operation this tipple's bulletin of "Work Tomorrow" has long shown no change except the daily marking of the date!).

No wonder, then, that this Slovak mother explains:

"Yes, so glad we come to America. Life for all people here better like any countree in all world. America want to help all countrees everywhere!"

But still and all, I'm carrying away an unpleasant burden of concern about their beloved new—and our beloved old—homeland.

Down inside yesterday a group was hurrying to timber up the roof where a section had been blown down for a new ventilating overcast.

"Listen," the boss ordered. Then, after a moment's tense silence came the almost inaudible sounds of rock veins adjusting themselves to the new strains and stresses. "Yes, she's a-working! We'll hafta hurry."

Cross Currents

Throughout the town's various social veins and strata, so the week's listening reveals, "she's a-workin'!" Some of the new alignments represent huge improvements—improvements that bring increased production, higher wages, easier work, greater living comfort, bigger opportunities of many kinds. But in the matter of employer-employee adjustment it is plain that if disaster is to be avoided "We'll hafta hurry!" Certainly strong shoring is needed if these—the town's two main socio-economic veins—are to find the equilibrium of common understanding and cooperation. Meanwhile, work may not be so plentiful or regular. If so, will the job giver then proceed to abuse his power as sorely as these job takers' leaders now seem to be abusing theirs?

It is devoutly to be hoped that he will not. After all, the employer cannot plead the lack of education which is the deepest cause for the bitterness of those two committee spokesmen. The employer's wider intellectual and

economic margin puts upon him the responsibility of greater wisdom, longer view, larger forbearance. In time, of course, that imposing hilltop high school and countless others like it can be expected to get in some good licks with bosses and miners alike. Lord knows, they're badly needed! Luckily, more and more companies are now enrolling their foremen in conference classes for discussing the defects of driving and the advantages of leading. Especially now that more and more machinery is being used for better and less wearisome production, more managers than ever before are devoting themselves to the study of the human factor in their difficult but nevertheless essential equation.

Meanwhile, too, the industry's national leaders on both sides are getting closer together as they discuss cooperation in their current effort to explain to "supers" and workers as well as to the public the nature and importance of the industry which they all, at heart, love. Both agree that their common goal is prosperity for coal. Both—and perhaps in this lies hope of greater understanding—take an almost devout pride in the industry on whose efficiency and well-being they—and all of us—depend.

From the tipple comes the rhythmic pounding of the ponderous mechanical shaker screens as they tirelessly, hour after hour, facilitate the separation of the big from the little. Perhaps all that's needed is that in this and other coal communities men of good will as diligently and as ceaselessly continue to put aside the unfair and the little and hold to the fair and the big in all their daily dealings with one another. If so, the time will surely come when, throughout King Coal's domain, they can look past the towering slate dumps to the pleasant hills beyond and exclaim:

"How green—how useful and *how happy*—is my valley!"

Challenge to Management

TEAMWORK between miners and operators is accepted as the key to maximum progress for coal. Achievement of that teamwork manifestly depends upon mutual trust and respect. Have that mutual trust and respect been attained or, if not, what are the prospects? Having studied the problem in actual work at one mine 25 years ago, Whiting Williams naturally returned to that operation as the best method of gathering data for comparing both physical improvements and employee opinion under as nearly similar circumstances as possible. As his report shows, ideas flowed freely. These ideas may or may not be typical of the thinking of all miners, but in this one operation, at least, the findings lead to one major conclusion:

Despite all the physical improvements made to increase efficiency, ease the miner's tasks and increase his earnings along with those of the industry, his attitude toward the operator and toward the industry remains virtually unchanged in 25 years.

The logical question is: Why? The answer would seem to be that doubts amounting sometimes to convictions still remain in the miner's mind. Regardless of their origin—and some at least arise out of circumstances over which the operator has little control—they present a challenge to management and, it might also be said, to the union, which certainly has as big a stake in coal's progress as the operator.

The miner's opinions inevitably influence the degree of understanding and teamwork that can be achieved in the industry. Question No. 1 is, therefore: What is the miner thinking? Question No. 2 is: Are his opinions based on fact or on prejudice? Some aspects of Mr. Williams' findings are analyzed briefly in the following:

Wages, Hours and Taxes

"The rich, they caused the war and they'll get the only benefit from it."

The miner ignores the fact that his basic hourly wage is higher than all but three manufacturing and non-manufacturing groups, according to the Bureau of Labor Statistics. Only recently have coal companies begun to make a small profit, and between 1929 and 1940 the industry lost millions of dollars yet kept the miner on his job. Has management considered the benefit that might result from a down-to-earth factual explanation of company and industry finance and policy to all employees?

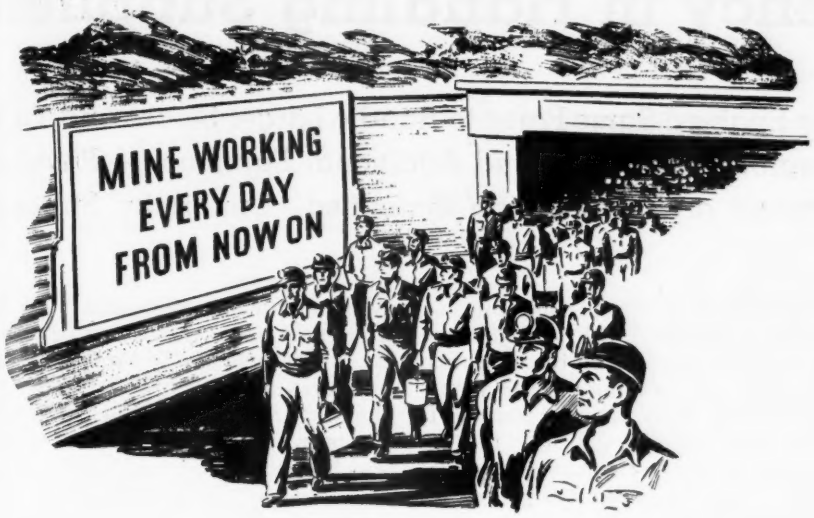
"This six-day week they figured out to get more coal for themselves and, so they said, more money for us. That's too much and too hard work."

Longer working time was sheer necessity if wartime demands for coal were to be met. If the miner is overworked, so is everyone else, not excepting and perhaps starting with the boss. Even if everyone is fed up with it, has management really asked the miner often enough: "Don't you know there's a war on?"

"Take for instance, my vacation pay. Why should I pay taxes on that as part of my income?"

Taxing of vacation pay was a Treasury Department ruling, not an idea of management. It is only one instance of a welter of government regulations that have reconverted everyone's living conditions, not alone the miner's. Rationing of gasoline, food, shoes; shortages of all luxuries and some necessities; withholding taxes, payroll deductions, job-freeze, hold-the-line and a plethora of other regulations and restrictions have altered the social and economic structure of every home. Does the miner always understand that many of the most obnoxious restrictions are only temporary? Does he al-

ways understand that the company simply acts as an enforcement and collection agent for regulations, that it does not originate them?



Machine and Opportunity

"Loading machines? Sure, they mean smaller pay, but they're easier work and I'm for them—but only provided that the company pays a man enough to give him a good living and also takes care of the four or five men he and his machine pushes off into starvation."

The union has placed its unqualified blessing on mechanized mining, because it knows that in the long run it makes the miner's job easier and brings more prosperity to the industry and its employees. But even the union admits that its psychology has not always been accepted by the miner; witness the repetition of the belief that the machine results in starvation for more men than it employs. Any study of the employment record shows that natural departures from the industry more than compensate for reduced requirements in machine mining, while the standing of coal in the government earnings lists should be sufficient answer to complaints of lack of a good living. Is the persistence of this opinion among miners an indication that further work in telling the story of the benefits of the machine is a necessity? If so, here is an opportunity for a real achievement.

"The traditional curse of irregular operation."

Irregular work has always been a problem in the coal fields, not because management wanted it that way but because of the fundamental economics of the industry and the way its customers take its product. To understand how steadier work can be achieved it is necessary to understand at least something of the competitive position of the industry. The miners to whom Mr. Williams talked unwittingly showed a depressing lack of such understanding. (" 'Competitive fuels? Nothin' but lies and bunk!' ") Throughout all his conversations with miners Mr. Williams found a fear—unconscious perhaps—of insecurity. The miner's improved working and living conditions of today are possible only because under the American system, efficient management, cooperating with and having a responsibility to labor, has created the opportunity to work. Greater security depends on a continuation of that system, free from government strangulation and enjoying an exchange of ideas and a community of interest with labor.

The Miner and the War

"Work overtime? Not me! It makes my taxes too big. My wife and I ain't got no children. So the more I earn the more I get skinned. . . . I didn't have no part in causing this war. So why should I help pay for it? . . . No. I don't buy no war bonds"—miner.

"After payday absenteeism soars. It's hard to figure out how some of them can walk past the Honor Roll without blushing for shame"—supervisor.

It is a grave mistake to assume that the miner is unpatriotic ("T'ree boys in Army, one in Navy"; "so glad we come to America"; 900 names on the Honor Roll; nearly 100,000 miners gone off to war; more than 2,000 men killed in service; almost $161,000,000 in bonds purchased by miners). At the risk of wearisome repetition, it might be pointed out that one reason the miner does not fully appreciate that there's a war on is that his union has not participated in telling him about the vital need for wartime tonnage increases. The place of coal in war is a dramatic story. But, because coal is not used in actual combat, it may seem a long way from the coal mine to the battlefront, yet without coal the battlefront would collapse. Has that story been told the miner in entertaining, dramatic fashion?

Class Struggle

"All they think of is their class war—against all employers."—supervisor.

"If we give management an inch, they push us back a mile"—miner.

The miner has an abiding and carefully nurtured conviction that coal companies in general are not to be trusted. His suspicion is directed not so much against individuals (" 'they all consider their bosses, big or little, individually honest and fair' ") as it is against management in the abstract. Yet coal for the last ten years has been operating under a wage contract reached by mutual agreement between management and labor. Even the public, which is not inclined to be overfriendly to coal operators, considers that they treat employees as well as management in other industries ("Public Relations: Coal's No. 2 Problem," *Coal Age*, September, 1943).

The miner's class struggle—if, indeed, he thinks of it as such—is not the class struggle as the United States has come to know it in the past twelve years. Rather it seems to be a fear that if management should again be put into position to use the whip, it would descend quickly and heavily on the miner's back. Experience does not reveal any ground for such fears, nor does ordinary common sense. Management knows that fair treatment is the best incentive for a fair day's work. But, to be scrupulously honest about it, does management's performance always match its convictions?

Management realizes that the miner's problems are its problems too. But does the miner also understand that management's problems are likewise his? In the long run those policies which benefit management also benefit the miner. But does the miner know what the policies are and how they will benefit him? Both labor and management have a prosperous industry as the common goal for their joint profit. But do they both fully understand that they will reach it quicker through mutual understanding and respect?

KOPPERS METHODS

Promote Efficiency in Handling Supplies

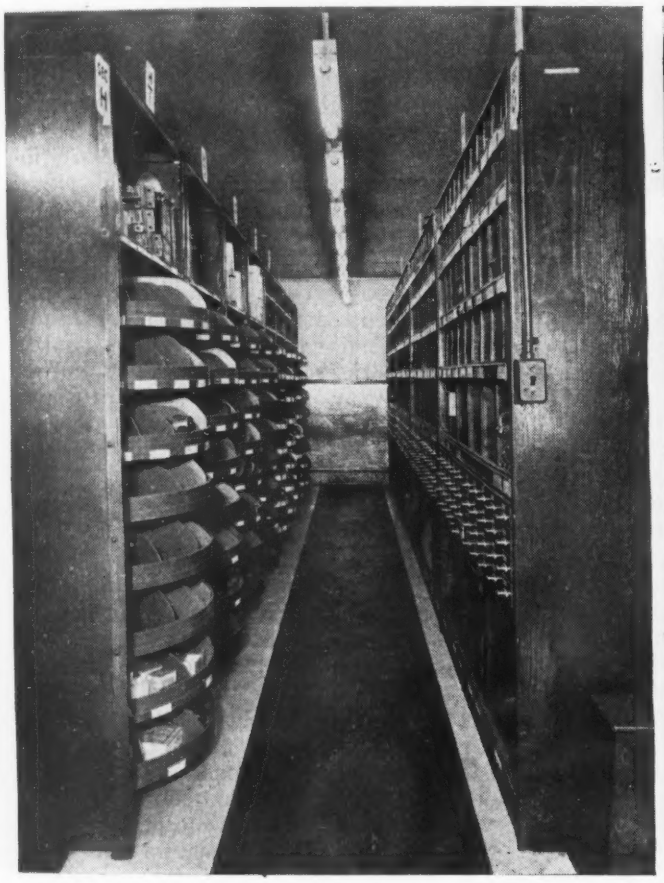
Changes Enabled Same Force to Handle Larger Stocks and Turnover Resulting From War and Additional Equipment—Physical Arrangement and Accounting Simplified—Uniformity Stressed

By J. H. EDWARDS
Associate Editor, Coal Age

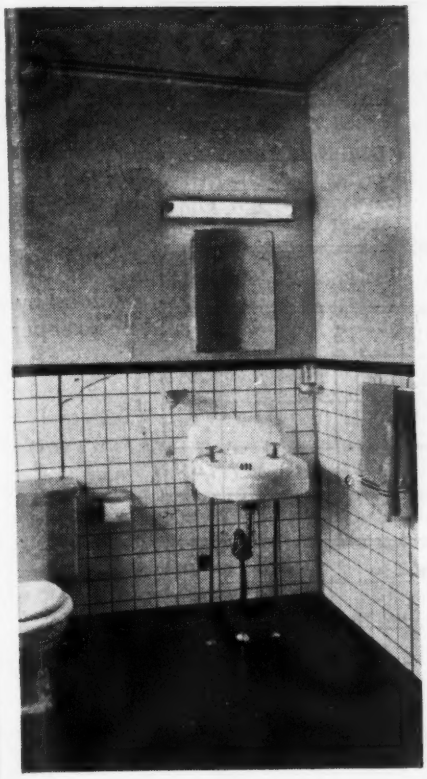
TO PRODUCE 14,000,000 tons of bituminous coal annually from 24 mines in the States of West Virginia, Kentucky and Pennsylvania, mine supply houses of the Koppers Coal Division, Eastern Gas & Fuel Associates, handle approximately $8,000,000 of materials for the operating, capital, and house and town maintenance accounts. The company has had a man in general charge of this supplies-handling job since 1932. By a steady improvement in storage and disbursing facilities, together with simplification and standardization of the perpetual inventory and accounting, the supply system and the personnel operating it have met without difficulty the increased burdens of serving more machinery and of keeping larger stocks of critical items.

Thirteen supply houses serve the 24 mines, from which it might be assumed that there is a strong preference for central supply houses. That is not true, as indicated by the fact that in the last two years a decentralization has been effected at the Carswell, Maitland and Keystone mines in McDowell County, West Virginia. Formerly a warehouse at Kimball served all three mines. Now it serves only the first two, while a new supply house has been installed at Keystone mine, which produces approximately 4,500 tons per day, about half by mobile loading machines.

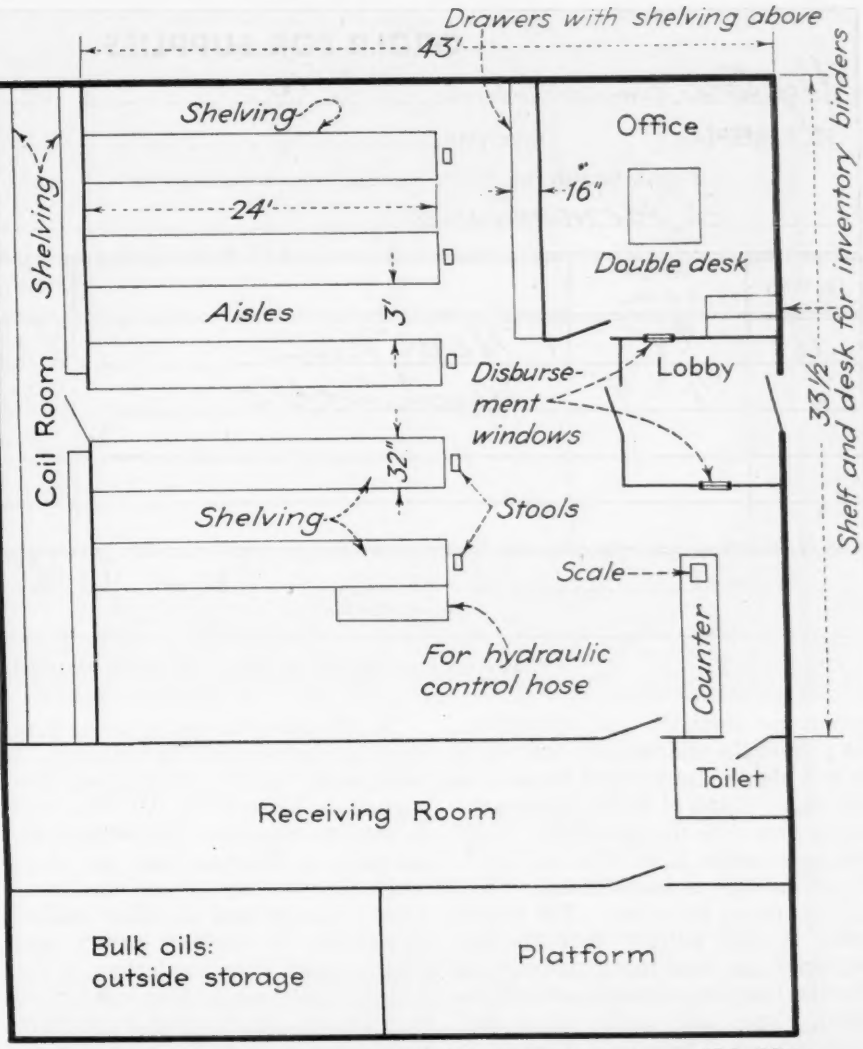
Most of the Koppers mines are old properties bought from other companies. At Powellton, W. Va., the former owners had a central warehouse in operation, so it was continued and serves five mines. Two are each 20 miles distant, but since they are rela-



At the left is a row of rotary bins under 18 in. of shelving. At the right are four rows of drawers (160 total) along the shelving in the 22- to 36-in. space up from the floor. Reflection insures light from the row of eight 30-in. fluorescent lamps getting to the backs of the lower bins. Right: Some sections of the rotary bins are fitted with drawers. The open one is partitioned into 18 spaces.



The toilet room is featured by good fixtures, excellent lighting and cleanliness.



The Keystone supply house was built by utilizing space in an old building.

tively small producers (950 and 1,200 tons), individual supply houses for them hardly would pay.

When the Kimball supply house was somewhat decentralized by the Keystone installation, the stock of parts and materials kept in the Keystone shop for ordinary and emergency requirements, and which was replenished from the Kimball supply house when depleted, was moved into the new supply room. It had been considered necessary to have a fairly large stock on hand in the shop because of delays that would result if it was necessary to wait for parts from Kimball, which is six miles away. The systematic binning and means of identifying material in the new stockroom, enabling the supply clerk to obtain the required items without delay, resulted in a saving of time for the mechanics in the shop. The new supply room at Keystone is in the same building with the shop.

Total inventories, rail and timber included, for all Koppers mines, like those of other coal companies, are considerably higher than three years ago. Principal reasons for the increase are: (1) greater urge for production with fewer delays from equipment failures and lack of materials; (2) larger minimum stocks as a result of slow deliveries; and (3) timber being especially difficult to obtain, a considerably larger stock must be kept on hand.

The 24 mines cover a wide range of

Ends of aisles between shelving face the office and disbursement lobby at the Keystone supply house. The stools are carried into the aisles only for reaching to the backs of the upper shelves. The pigeonhole cabinet at the left is for hydraulic-hose storage.

ORDER FOR SUPPLIES

Keystone Operation Ordered 5/16 1944

STOREKEEPER: Disbursed 19

Please furnish the following supplies, to be used for Locomotives

DISTRIBUTION
COST % 37
DOE No.
SO No.
CLASS 2

Added by disbursing clerk

Quantity	Symbol Cat. No.		Bin No.	Price	Amount
6	7/8"	Hex. Nuts	L-2-702		18
6	7/8 X 4"	Mach. Bolts	J-3-504		30
					48

Added by bookkeeper

Approved Superintendent

Signed J. B. Q. Foreman

Orders for supplies provide spaces for listing bin numbers and cost.

producing methods and conditions. As a whole the underground machinery is not highly standardized because of the many items of usable equipment taken over with the properties. Daily tonnages range from 950 to 7,000. Some tonnage is hand-loaded. Over 225 conveyors are in use. The largest mine is 100 percent mobile-loader equipped and uses many rubber-tired shuttle buggies. Operations include drifts, slopes and shafts—gassy and non-gassy—and the seams range from 30 to 80 in. thick.

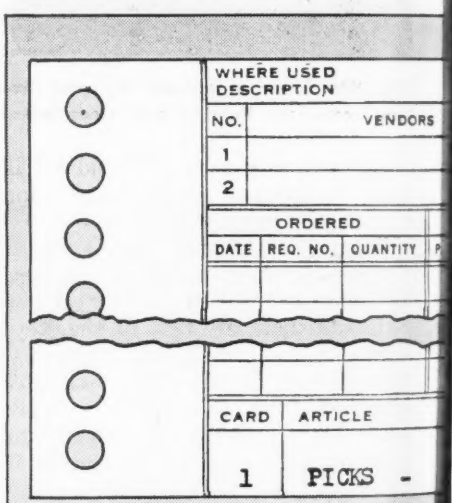
The purchasing department is in the Koppers Building, Pittsburgh, where also is located the operating headquarters for the Coal Division. L. C. Campbell is vice president; H. John Harper is assistant to the general manager of mines and has the Keystone, Carswell, Kopperston, Maitland, Weeksbury and Wharton mines under his direct supervision. M. A. Evans is chief engineer. A. E. Manning, who, with one assistant, has charge of arranging and equipping all supply houses and physical inventories, reports to Mr. Campbell but resides in Beckley, W. Va. Supply clerks report to the mine accountants, who are responsible for all accounting and maintenance of standardized records at the mines and who, in turn, report to the superintendent. Mr. Manning works through the superintendent and supply clerk, mostly with the latter, since most of the matters involved have to do with arrangement of stock, inventories, records, etc. Harry A. Quenon is superintendent of the Keystone mine, where the supply house which will be described in some detail later in this article is located.

In all cases the supply rooms have been arranged in existing buildings. A new supply house now nearing completion at Kopperston, W. Va., will be the one exception. It is 30x160 ft., comprises a basement and first floor and will serve two mines, one a conveyor operation and the other worked exclusively by mobile loaders and shuttle cars. Total production of the two is 6,000 tons per day. A feature in each large supply house is a modern toilet room with up-to-date toilet fixtures and good lighting. This accommodation promotes neatness and an interest in the work.

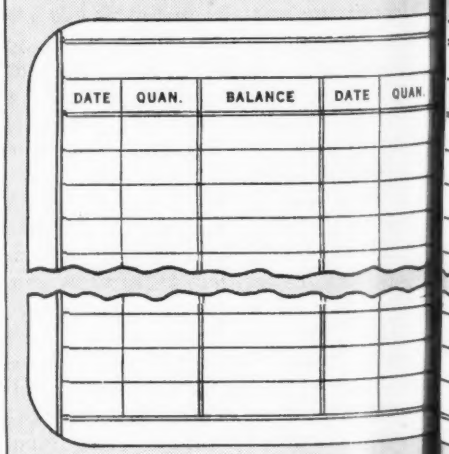
One Underground Storage

Supplies in appreciable quantity are kept underground only in Carswell mine. This is because a shop is underground 4 miles from the shaft. The supply clerk has no control over stock items after they leave the top supply room. And while this article will deal primarily with the methods in aboveground supply rooms, relation to the underground distribution of parts and the handling of timber and lubricants will be considered.

The full mechanical mines keep a few charged-out items of small repair parts on the sections. At Keystone mine, in which eight mobile-loader sections are operated double-shift, a traveling crew of two men on each shift has the use of a special self-propelling "jeep" which carries an extra traction motor and head motor for the loaders. This has a covered and locked spare-part compartment with many partitions in which the parts are replenished at the end of each shift



Front of stock record card

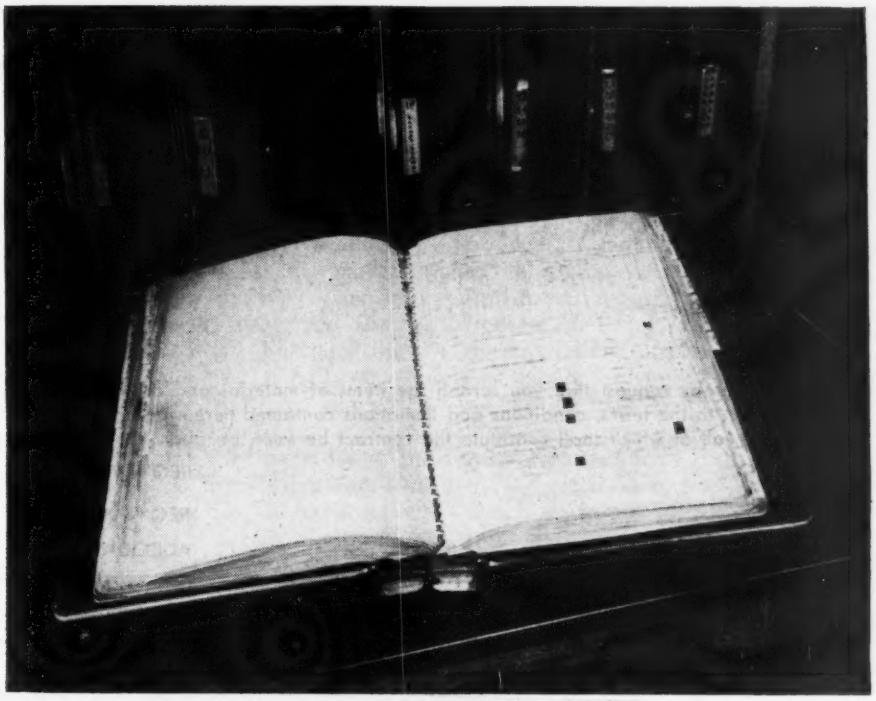


Back of stock record card

when the jeep is brought outside and parked beside the shop and supply house. For further details of this jeep see p. 114 of this issue.

In this Keystone mine, a drift operation, four dispatchers are employed each shift and each takes care of a first-aid station and repair-part depot. A dispatcher puts a part on the trip or orders that part from the outside supply room ready for the next trip. Furthermore, a supply board and a few supply bins are maintained on each section for the parts needed most frequently.

The supply house disburses and charges out oils and greases only in



One of the automatic-shift stock books opened to a page of stock-record cards. Two of the cards have signals near the outside edge indicating "Order" and four have signals near the center indicating "On order but not received." Stock-record cards (see below) provide 16 receipt and 175 disbursement spaces.

| | | |

KOPPERS COAL DIVISION

EASTERN GAS AND FUEL ASSOCIATES, PITTSBURGH, PA.

PURCHASE ORDER

DATE

ORDER No.
This order number must be shown on all shipments, invoices, correspondence, etc.

We hereby request that you furnish the items of material and/or workmanship listed below upon and subject to the terms, conditions and limitations contained herein and/or printed on the reverse side of this sheet, all of which shall constitute the contract between us, upon your acceptance hereof.

SHIP TO:

REQ'N DATE

REQ'N NO.

SHIP PREPAID VIA

ACCOUNT NO.

PURCHASE POSSIBLE	Quantity	Description

Mine requisitions and purchase orders are combined in one form comprising an original and three carbon copies for requisition, ordering and record-keeping.

PRICE

SHIP

F.O.B.

TERMS

All transportation charges must be prepaid.

This order is based on the understanding that the W. Va. two-cent retail sales tax is not applicable to the subject matter hereon.

INVOICE INSTRUCTIONS:

Send to division purchasing agent original and three priced copies of itemized invoice and original bill of lading.

Show separately on your invoices all freight charges prepaid or allowed to destination.

Invoice each order separately.

KOPPERS COAL DIVISION
Eastern Gas and Fuel Associates

ROYCE D. KING
Division Purchasing Agent

For Division Purchasing Agent

	MATERIAL RECEIVED		INVOICE APPROVED				MATERIAL RECEIVED		INVOICE APPROVED		
	Date	By	Date	Amount	Trans.No.		Date	By	Date	Amount	Trans.No.
1						5					
2						6					
3						7					
4						8					

Second or pink sheet

INQUIRY TO	PRICE	F.O.B.	DELY.	REMARKS

Third and fourth (green and yellow)

ORDERED BY

APPROVED BY

bulk containers. The operating men take these to a small oil house nearby where a day's supply is kept and where the cans or drums of 10-, 15- or 25-gal. sizes are filled for current needs. Locomotives are lubricated on the outside near the shop and oil house. The eight mobile loaders and their cutting machines are lubricated between shifts by a special crew of men who operate an oil trip.

Supply clerks are responsible for the mine timber. A man reporting to the supply clerk checks in the timber and assists when a physical inventory is made.

General arrangement of bins, bin numberings according to locations, perpetual-inventory stock-record cards and the entire supplies accounting has been standardized so completely at all supply houses that a man familiar with the system can find any part readily in any supply house. Thus, if a man is transferred from one division to another or is borrowed in case of a shortage of help, he finds himself at home. Moreover, a new man can learn the method of locating parts from stock-record cards in a short time.

Because the Keystone warehouse was the one last completed at the time of this writing, it is shown in the floor plan and other illustrations. Except for that floor plan, which necessarily was adapted to the room available, the pictures for Keystone fit the other supply houses. Cards and forms, of course, are the same for all.

Instead of the usual method of grouping all parts for a certain make and type of machine in adjacent bins and labeling that section accordingly, the parts are assigned to any bin available. Each row of bins is given a letter, beginning with "A," each shelf or section is given a number beginning with "1" and the individual bins or pockets of that division are given individual numbers beginning with "1" and going across or up and down, depending on arrangement.

To explain the procedure of disbursing a part it might be assumed that a mechanic comes to the window of the lobby with an order for a part for a controller of a locomotive. That order states the name, make and catalog number of the part. The clerk opens a binder, refers to the perpetual inventory card for that item, notes that some are in stock and from that card makes a notation on the order to the effect that it is in a certain bin—for instance, "C-3-25." He steps to section "C," moves over to division "3" and gets the material from bin number "25."

Rotary Bins Employed

The supply room has one section composed chiefly of rotary-type bins for small parts. Here are eight units, or tiers, each with eight round trays and each tray divided into segments. One rotary unit includes small drawers with partitions. Units stand 61 in. high and above them there is 18 in. of shelving. In this one section 7 ft. high by 24 ft. long 2,500 items are stored in separate compartments. Approximately 8,000 items are accommodated in a floor space 30x33 ft.

Height to the covers of the top shelves is 7 ft., so that a man of medium stature can reach most items conveniently from the floor. To afford access to the topmost row—that is, get the hand into the back end of the shelf (depth 16 in.)—Pullman-type stools are kept available at the ends of the sections. A single row of eight 30-in. fluorescent lamp tubes hung 7½ ft. from the floor provides enough light so that reflection adequately illuminates even the back ends of the lowest shelves.

As shown in floor plan, coils are kept in a separate room, 7x33 ft., partitioned across the rear. Shelving 2 ft. wide fills each wall, leaving a 3-ft. aisle. In the main room five double-faced sections of shelving, with 3-ft. aisles between, project from the partition. Against the office partition is another section the lower part of which accommodates a number of drawers 5 in. wide, 3 in. deep and 16 in. long. Sides of each have nine vertical slots into which pieces of ⅛-in. pressboard can be inserted to divide the drawer into as many as ten compartments. Special shelving for hose for hydraulic systems has 39 pigeonholes each 6 ft. long (p. 110 of this issue).

Two of the supply houses, Powellton and Grant Town, both in West Virginia, have been equipped with racks mounting special reels for storing and disbursing wire ropes and electrical wires and cables. At Powellton, where the first racks were built under the direction of E. A. Miller, chief electrician and assistant superintendent of Elkridge No. 3 mine, the rack capacity is 26 reels. Shafts, supporting reels keyed onto them, are on ball bearings, have square ends for hand cranks and are fitted with brakes. This arrangement, together with a portable measuring, cutting and reeling truck, is illustrated and described in more detail on p. 112.

A perpetual inventory of each of the 8,000 items is maintained on a 5x10½-in. stock-record card filed in an automatic-shift visible record binder. At Keystone eight binders are in use,

INVOICE FORWARDING STATEMENT

List No._____

_____ (Operation)

Date_____

DATE	ORDER	SHIPPER	AMOUNT	PLANT AUDIT NO.	REMARKS
TOTAL OF SHEET					
TOTAL OF PREVIOUS SHEETS					
TOTAL TO DATE THIS MONTH					

An "Invoice Forwarding Statement" aids in keeping track of bills.

REPORT No. 9

THIS COPY TO	
ASS'T TREAS.	
COST DEPT.	
MINE FILE	

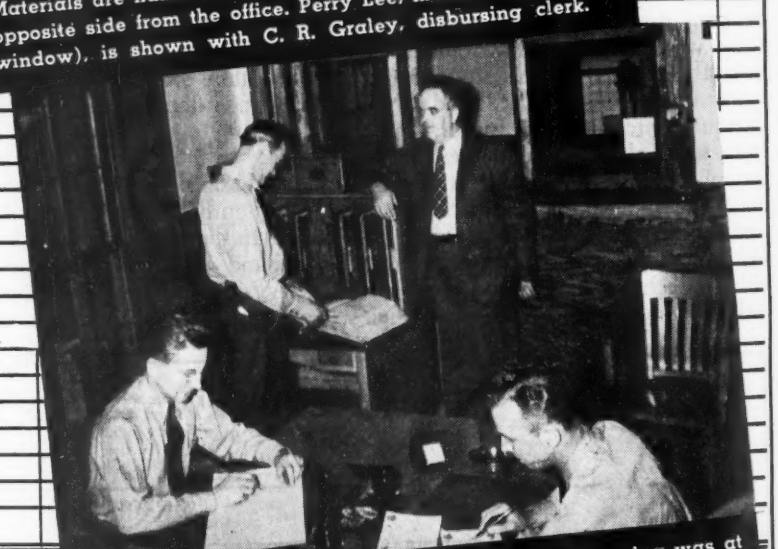
MINE SUPPLY INVENTORY REPORT

_____
(Operation)

MONTH OF_____19____

No.	Classifications	Inventory	Charges	Total	* Adjustments	Disbursed	Inventory .....
1.	Air Compressor Parts						
2.	Bolts, Nuts, Washers, Nails, etc.						
3.	Building Material						
4.	Electrical Supplies						
5.	Empties						
6.	General Electric Loco. Parts						
7.	Goodman Loco. and Mach. Parts						
8.	Loading Machine Parts						
9.	Conveyor Parts						
10.	Hose, Ropes and Belting						
11.	Iron and Steel						
12.	Jeffrey Loco. and Mach. Parts						
13.	Lumber and Timber						
14.	Mine Car Parts						
15.	Miscellaneous						
16.	Miscellaneous Repair Parts						
17.	Oils, Grease and Waste						
18.	Packing and Gaskets						
19.	Paints and Glass						
20.	Pipe and Fittings						
21.	Pump Parts						
22.	Sand						
23.	Stable Supplies						
24.	Sullivan Mach. Parts						
25.	Spares						
26.							
27.	Track Material (No Steel Rail)						
28.	Trolley Material (No Wire)						
29.	Steel Rail						
30.	Trolley Wire and Feeder Cables						
31.	Westinghouse Loco. Parts						
32.	Shop Orders						
33.							
34.	Rock Drills and Jackhammers						
35.	Calcium Chloride						
36.	Purchased Power						
37.	Directly Distributed						
38.	Obsolete Material						
39.							
40.							
	TOTALS						

Materials are handed out through a lobby window on the opposite side from the office. Perry Lee, mechanic (in the window), is shown with C. R. Graley, disbursing clerk.



Supply force at Keystone on a day when A. E. Manning was at the mine. Left to right are P. K. McKnight, bookkeeper; C. R. Graley, disbursing clerk, looking up a bin number in a stock-record book; Mr. Manning; and E. C. Mullins, chief supply clerk.

* NOTE:—Inventory adjustments to increase inventory to be mar... column should in all cases agree with the debit or cr...

SUMMARY OF CHARGES

Accounts Payable (Forwarding Lists)	
Journal Entries (Report No. 2-A)	
From Labor Distribution (Report No. 2-A)	
Journal Entries (Report No. 2-A) Powellton Two	
Journal Entries (Report No. 2-A) Powellton Four	
Petty Cash (Report No. 2-A)	
TOTAL	

"Mine Supply Inventory Report" rounds out the list of records covering supplies at Koppers mines.

each having about 40 index sheets and up to 27 cards per sheet. These stock-record cards are double-faced and the total of entry spaces includes 16 receipt lines and 175 disbursement lines, which as an average works out rather well in utilizing most of the space on a card before a new one must be used.

For convenience when placing in a typewriter, these cards are ordered three per sheet (10½x16 in.) with an extra margin of 1⅛ in. and perforations for separation after typing. Stock cards for spare parts are filed numerically according to the manufacturers' catalog numbers and under classifications applicable to that particular type of equipment. Miscellaneous and electrical supplies are filed alphabetically under proper classifications.

Signal Shows Stock Level

To indicate that the stock of an item is getting below normal and that more should be purchased, a signal is clipped to the bottom edge of the card near the outside end. After the requisition has been made and mailed to the purchasing agent the signal is moved to a position near the center, still on the bottom edge. After receipt of the material and during posting of the invoice the signal is removed. A new average price is placed on the card after receipt of new material at a price different from the former average. When physical inventories are made—about once a year—the fact is denoted by affixing on the card the date with a rubber stamp.

On this stock-record card all receipt balances are carried in red ink, and all disbursement balances in black. In making the physical inventory, totals are affixed in pencil, then after being added are erased. Figures giving maximum quantity to be carried in stock and the quantity to be ordered are placed in designated spaces at the upper right-hand corner on the front side of the card.

Mine requisitions and purchase orders are combined in one typing of a white form under which carbon duplicates of the mine requisition data are made on three other forms (pink, green and yellow) which are similar to the white except for the bottom part. The pads of these forms are made up in sets of four. After the supply clerk has typed in the quantity and description he posts that information on the stock-record card under the heading "Ordered," retains the yellow copy in his files and sends the white, pink and green to the purchasing department in Pittsburgh. The latter sends the white to the vendor or shipper as an inquiry.

After the order has been placed the purchasing department types the order number, shipper's name, price terms, and so on, onto the pink sheet, at the same time with carbon putting that same data on the green. Then the pink is returned to the mine-supply house and the green is retained in the purchasing department. After the mine gets the pink form, the yellow one originally retained may be destroyed.

When the pink form, which is a complete copy of requisition and purchase order, arrives back at the mine, from it are posted on the stock-record card the order number and vendor's name. At the same time, reading from the stock card, the clerk makes a notation of the bin location on the purchase order, so that when the materials arrive the receiving clerk will know from the purchase order where to put them.

At the end of each day an "Invoice Forwarding Statement" is made up listing the invoices and dollar amounts of each, and giving the total dollars, total of previous sheets for the month and total including the current date.

Materials are classified under 38 numbers and when disbursed are charged to one or more of 40 cost accounts. When a foreman signs an "Order for Supplies" he must include, in addition to the specifications and quantity of material, the mine name and for what it is to be used. The account number is posted by the clerk who compiles the cost distribution. When the mechanic or helper presents the order at the office window in the lobby of the supply house, the disbursing clerk, referring to a stock-record book, turns to the card for that material and on the order writes the bin location, class number and unit price. He carries the order with him to the shelves, locates the material and hands it to the man at another window on the opposite side of the lobby.

Orders Carry Costs

The material having been disbursed, the "Order for Supplies" is given to the bookkeeper, who posts the stock-record card with date and quantity and the new balance. From information on the stock-record card he also posts the price and amount on the "Order for Supplies." These supply orders are sorted according to material classifications and the dollar amounts are then listed under those classes on a work sheet consisting of a large columnar pad. This listing is kept daily until the end of the month, when the disbursements for each individual classification are added and the totals entered on a disbursement report. After that the cards are sorted according to cost accounts and likewise posted on a columnar work sheet, and these data also are kept daily until the close of the month.

Totals of the two work sheets must balance when posted on a "Monthly Mine Cost Work Sheet."

At the end of each month receipts and disbursements are totaled by classes on a "Mine Supply Inventory Report," copies of which are sent to the assistant treasurer, cost department, Mr. Manning, mine superintendent and mine accountant. Thus the figures of total inventory by classes become available monthly.

Inventories Made Yearly

Physical inventories, made about once a year, are complete to every item. These are made by Mr. Manning and his assistant. Successively the stock-record books are taken to a temporary desk in the supply room, where the man at the desk calls out the bin number from the stock card and the other counts the material in that bin and calls back the result. Adjustments made on cards are listed on another sheet to be used in making up the next "Monthly Supply Inventory Report."

Auditing is done at unspecified times by one of two field men reporting to the assistant treasurer in charge of accounting. The audits include spot checks of physical inventories to see if they agree with the balances shown on the stock cards.

Most of the supply houses are open but eight hours per day, and several of these, especially at the smaller mines, are operated by one man. Keystone, however, is open 24 hours per day and the total force consists of five men, three of whom are on the day shift. Powellton supply house, the largest from the standpoints of materials stocked and handled, is open only eight hours and its force consists of four men. Federal No. 1 supply house, at Grant Town, is open from 7 a.m. to 1 a.m., and its force consists of two men and a girl on the day shift and one man on the night shift. A girl is employed at each of three other supply houses as a helper.

Improvements of the last few years in the physical arrangements of the supply houses, together with short cuts made in the accounting without relaxation in control, have made it possible for the same number of supply-house workers to handle the greatly increased quantity of parts and materials which has resulted from a rapid expansion of mechanical mining.

Many of the shaker-chute pans sent in for repairs are received in the condition shown in this illustration.

SHAKER PANS

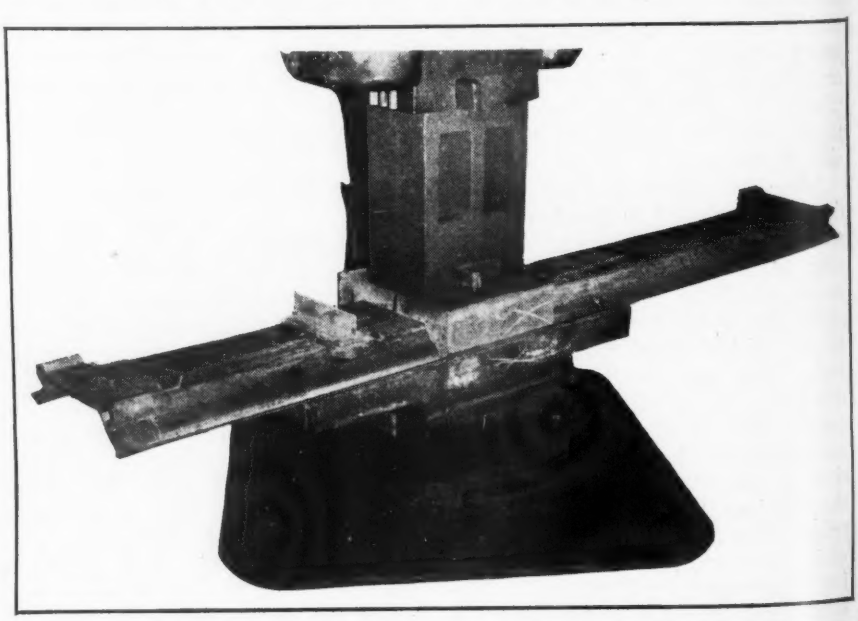
Repaired and Built New by Spot Welding

Air Hammer Used to Straighten Shaker-Chute Pans in Providence Shop — Attachments Fastened to New Pans by Electronically Timed Spot Welder — Tractor-Mounted Crane Moves Materials and Supplies

By RALPH R. RICHART
Assistant Editor, *Coal Age*

REPAIRING old shaker-chute pans and fabricating new pans are among the many jobs handled by the Providence shop of The Hudson Coal Co., Scranton, Pa. Pans now fabricated by means of an electronically timed spot-welder instead of the riveted method are more than meeting the exacting demands of service for shaker-chute mining equipment. Old pans come in from various collieries and are straightened, repaired and returned to those same collieries to insure their bearing the proper proportion of repair costs.

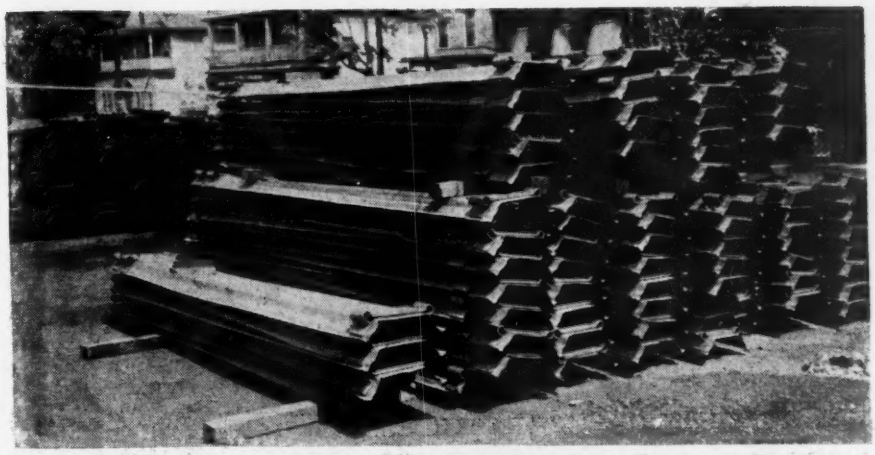
Routine repair work for all collieries is handled in the various buildings constituting this large repair center.



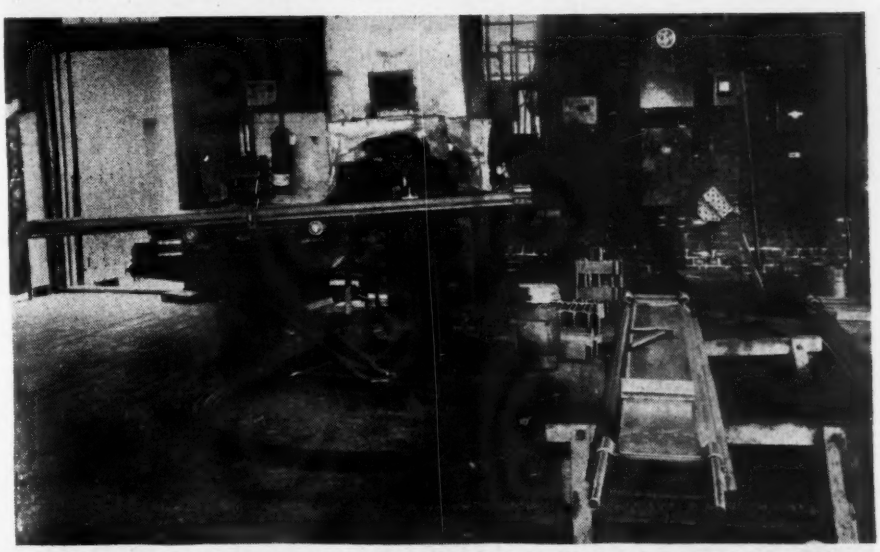
After being straightened, this shaker-chute pan is ready for removal from the air-hammer.

Each building does work of a special nature and all shop machines are manned by expert and seasoned craftsmen, alert for better ways to accomplish results. When emergency jobs come up, too large or too urgent to be brought into the main shop, specialists on such equipment are dispatched from the main shop to effect the necessary repairs on location.

Housed in separate buildings are the foundry, car, welding, blacksmith, machine and electrical shops. All buildings are kept at a comfortable temperature by heaters supplied with steam from a central heating plant. No repair problem is too tough to be tackled somewhere in the Providence shop. In the foundry, where molds are poured three times a week, using either iron or brass, everything from chilled-face brake shoes to 6-ft. sheave wheels is made. In one end of the car shop the latest in spot-welding equipment is used to fabricate new shaker-chute conveyor pans. In the machine shop metal-spraying equipment is busy every night building up shafts for high-speed pumps and many other parts. This work goes on at night so as not to interfere with the machinists in

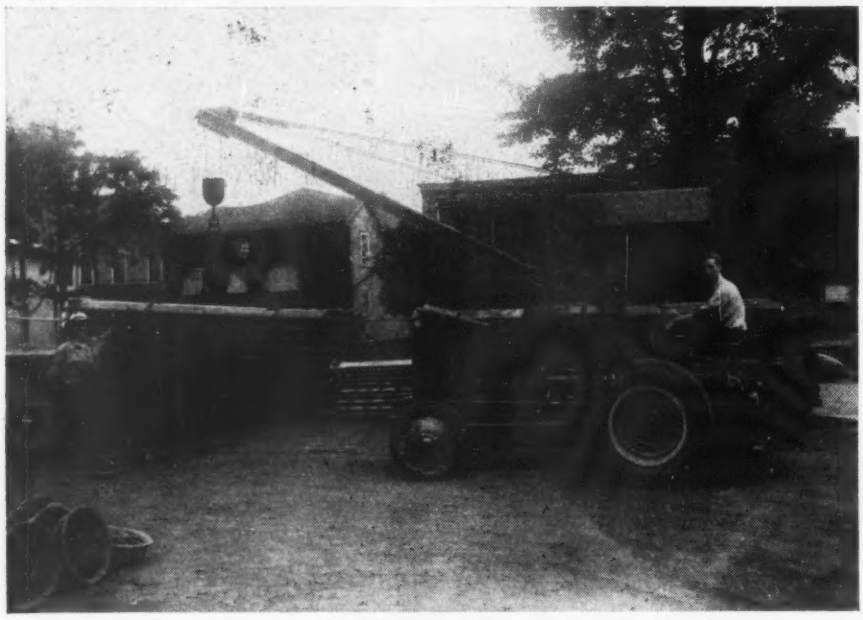


Reconditioned shaker-chute pans stored ready for shipment to the collieries.



Right: **New shaker-chute pans are fabricated by this spot-welding machine located in the corner of the car shop. Below: Operator preparing to fasten the ⅜x4-in. strap and $\frac{3}{16}$-in. gusset plate to the end of a new shaker-chute pan.**

Newly fabricated shaker-chute pans are stored in the yard until needed at the collieries.



Conveyor pans and other materials are handled by this tractor-mounted crane.

this building who generally work the day shift.

In the fabrication of new conveyor pans, 10-ft. sections of clean bright ⅛-in. steel sheets preformed into troughs and bare of any attachments are received at the shop. Fabrication of conveyor pans with a spot-welding machine in place of the riveting method formerly used requires parts that are bright and particularly clean. That much can be said of these preformed troughs as they are received at the shop. The same cannot be said for the attachments—straps, gusset-plates and tee-bars. They must be cleaned and therefore are tumbled in a "rumbler" in the foundry shop until they are thoroughly scoured and suitable for use.

A ⅜ x 4-in. strap and a $\frac{3}{16}$-in. gusset-plate are attached at each end of a pan trough by 24 separate spot welds. Between the ends of the trough, a ⅜-in. tee-bar is attached by some ten separate spot welds. As much as 40,000 amp. of current at 19 volts passes between the electrodes and through the layers being fused together at each contact point. Much of the speed of this entire operation depends on the operator and his helper who run the welding unit. At the present time this two-man crew completes about 28 conveyor pans in an 8-hour shift.

Welds made in this manner are performing very satisfactory in service. In instances of pan failure, under test conditions, a spot weld will not be pulled out without carrying with it a sizable area of the parent metal adjacent to the weld, indicating a failure of the parent metal.

The spot welder, a Thomson-Gibb Type 124-250 machine, operates from a single-phase 25-cycle 440-volt power supply. The primary current runs as much as 568 amp. and the kva. rating of the machine is 250.

The asbestos-covered hood with an air-lift for the protection and convenience of the operators, and the cradle and track for supporting the pan during the whole operation, were made on the job.

Pan Origin Kept

As old pans, many of which were of riveted construction to begin with, are returned for repairs, a notation is made on the records so that the same colliery gets them back. In this way, repair costs are charged to those collieries responsible for abnormal abuse of the equipment.

The first step in the rehabilitation of returned pans is straightening each one by an air hammer equipped with a die. This hammer is in the blacksmith shop and operates on air pressure of 90 lb. After going through this forming, pans are recognizable again. If any of the end-pieces or tee-bars are loose, rivets are knocked out and the pieces are cleaned before they are sent to the welding shop.

In the welding shop these pieces are again attached by a hand welder. Each old rivet hole is plugged full with a weld and care is taken to make sure that ample metal is deposited where needed. All torn places are welded and all worn spots built up or patched with plates. When these made-over pans are ready for the storage pile they appear to be as strong and as true in shape as brand-new pans.

A newly acquired "Roustabout Crane" plays a part in the pan fabrication and repair service in that it handles all the material. This tractor-mounted crane travels in and out of the various shops, loads and unloads cars and trucks and takes care of the general movement of equipment in the storage yard. A Hughes-Keenan Model MC1R unit, powered by a 4-cylinder International gasoline truck motor, the crane is capable of handling 1,500- to 2,000-lb. loads in almost any position of the boom. Solid tires are provided on the front of the tractor to facilitate steering.

Officials in charge of the Providence shop are: E. M. Snyder, mechanical engineer; Willard E. Apgar, superintendent of shops; Thomas R. Phillips, yard foreman; John Stewart, foundry foreman; Osborn Richards, electrical shop foreman; Dan Hartzell, blacksmith-shop foreman; John Travis, car shop foreman; and Albert Rees, machine-shop foreman.

CONVEYOR CONTROLS

For Explosion-Proof Service in Mines

Design and Construction of Explosion-Proof Conveyor Controls—Features and Applications of Simple Non-Interlocking, Simple Sequencing and Timed Sequencing Control Systems for Conveyors

By D. STOETZEL
Industrial Engineering Division

And B. J. MIMKEN
Industrial Control Engineering Division
General Electric Co.

CONVEYOR mining involves the use of face, room, entry and main conveyors for getting the coal at the face and carrying it to the main haulage system or even all the way out to the preparation plant.

Conditions in many mines dictate the use of explosion-proof equipment, particularly for face and room conveyors where there is little possibility that the electric equipment can be located in fresh air. While this article deals primarily with explosion-proof equipment in connection with conveyor systems, the information can be applied generally. Individual control items are suitable for all sorts of drives, such as pumps, fans, car pullers, slusher hoists, etc., where explosive atmospheres dictate the use of electric equipment having explosion-resisting features. Similarly, the conveyor control schemes illustrated may be applied whether or not the equipment is of the explosion-proof type.

The special attention to design and construction details required for explosion-proof equipment is well illustrated by Figs. 1 and 2, which show one starter in a new line of recently announced controls. These starters have heavy explosion-proof inclosures fabricated from steel plate. The wide flange between the cover and the case is ground to close tolerances to prevent the escape of burning gases. Each starter is equipped with a handhole cover which provides access to line fuses (Fig. 3) and, in addition, carries an inspector's seal.

Packing glands with seals are furnished in several sizes to match the cable being used, which must be of such size that maximum diametrical clearance between cable and gland does not exceed $\frac{1}{16}$ in. Fig. 4 illustrates the gland's simple assembly. The packing is wound around the cable and is squeezed between two cuplike sleeves which fit into the gland-nut. Changes in cable size are taken care of by selection of proper sleeve size. Where cables may be subjected to external strain, retaining clamps are available.

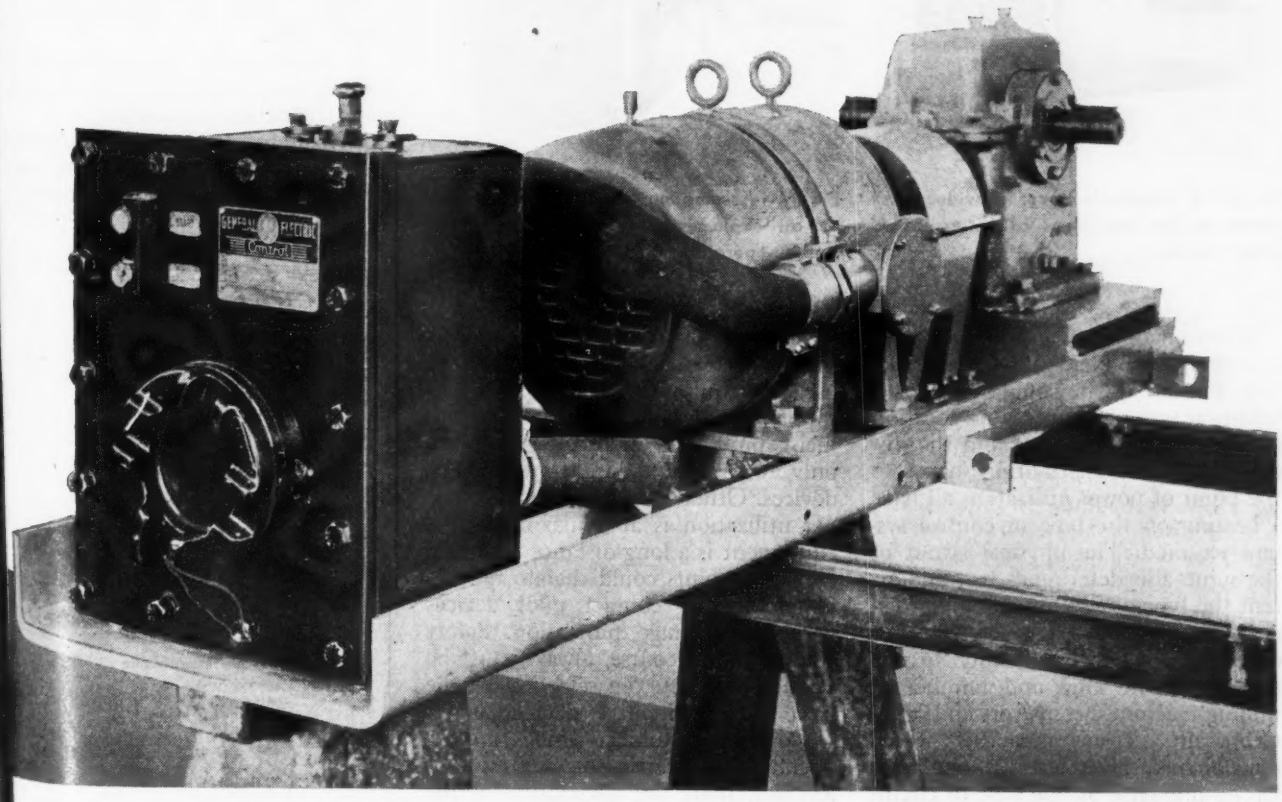


Fig. 1—Typical a.c. full-voltage explosion-proof starter shown connected to a squirrel-cage induction motor.

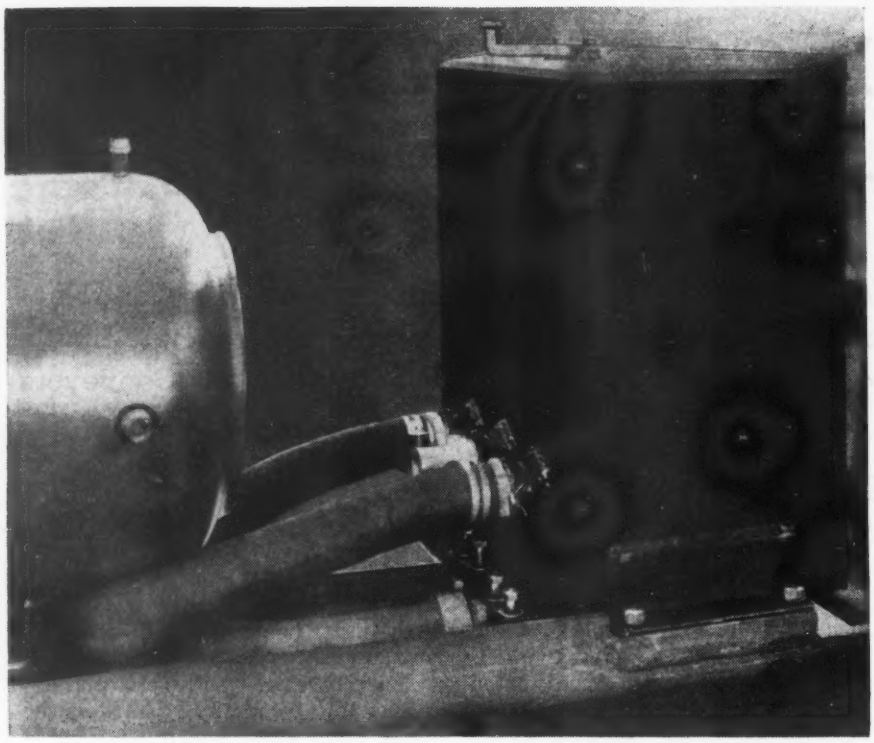


Fig. 2—Rear view of a.c. full-voltage explosion-proof starter, showing cable connections.

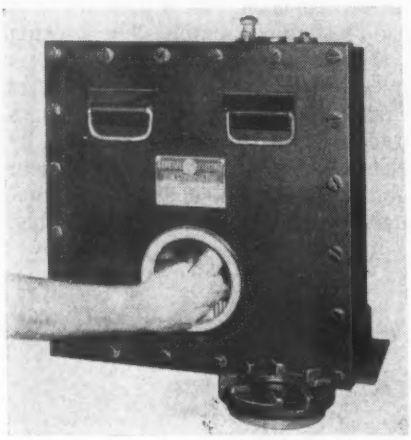


Fig. 3—A hand-hole cover provides easy access to the line fuses of an explosion-proof starter.

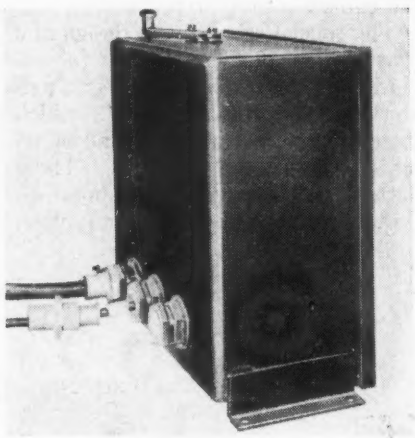


Fig. 4—Assembling the packing glands on an explosion-proof starter is a very simple operation.

Selection of the control for use in a mine is dependent upon many factors. The size of the copper in the distribution system, the size and location of conversion equipment and the distance from the distributing source to the point of power utilization all have a bearing on the type of control system required. The physical layout of the mine also determines to some extent the type of equipment to be used in order to achieve maximum efficiency of operation and availability to the operators. The kind and number of mining machines, conveyors and other electrically driven apparatus which may be in a given area at one time has an influence on the type of circuit and general control scheme to be used.

A given set of conditions, such as short power feeders, intermittent usage of equipment and ample power supply, may warrant the use of equipment built for undervoltage release only, with maintaining-contact pilot devices. Other layouts where the copper utilization is at a maximum and equipment is a long distance from distribution points could dictate the use of momentary contact pilot devices with undervoltage protection. Safety conditions, of course, always must be considered when the selection of the basic type of circuit is decided upon.

Conditions under which mining operations are carried on will more or less determine the advisability of the use of local or remote pilot devices. The number of men involved, the location of their normal work stations and the supervision required for a given layout also will bear on this subject.

Loading cycles, physical layout of the mine, and type of equipment used for given installations generally will indicate to what exent the interlocking between interdependent apparatus must be carried out. Interlocking is a type of electrical supervision and generally will be necessary when a change in a given mining operation affects the performance of any other link in the chain of coal production. More complicated sequencing set-ups may be required when system capacity and other factors enter the picture.

Basic Systems of Control

The following material is presented to illustrate the various factors involved and the advantages and disadvantages of different basic systems. In general:

1. Controllers may be nonreversing or reversing. All diagrams with this article indicate reversing.

2. The diagrams indicate the use of control fuses in certain cases. Control circuit fuses must always be furnished if the control conductor has a carrying capacity of less than 50 percent that of the main conductor to which the control circuit connects, except in certain cases where the control circuit is entirely self-contained on a single insulating panel in the control or when an 18-volt control circuit is used.

3. All Class BM starters include incoming line and motor-cable stuffing-gland entrances as standard.

4. Sketches of physical arrangement are schematic only and do not necessarily indicate actual gland locations.

NOMENCLATURE

M—Line contactor { MM—Main conveyor; EM—Entry conveyor; RM—Room conveyor }

OL—Overload relay (thermal)
SR—Stop relay
STR—Start relay
F, R—Interlocks on forward and reverse directions of reversing switch
P.B.—Push button

—Indicates control panel
—Normally open contacts
—Normally closed contacts
—Contactor coil
—Hose-protected cable
—Indicates extra stuffing gland if BM installation
—Fuse
T.C.—Normally open contacts, time closing

SIMPLE NON-INTERLOCKING SYSTEMS

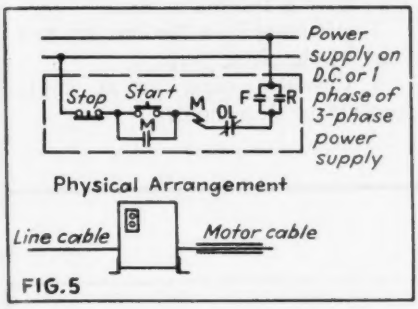


FIG. 5

Momentary Contact—Pilot Device (pushbutton) Built In

Advantages:

1. Undervoltage protection: Will not restart until the button is pushed. All motors will not restart at the same time. No danger from unexpected restarting on the return of power. Stalled motor or control is not subject to damage from cycling when overload relay is automatic reset.

Disadvantage:

1. Operator must be at control to restart.

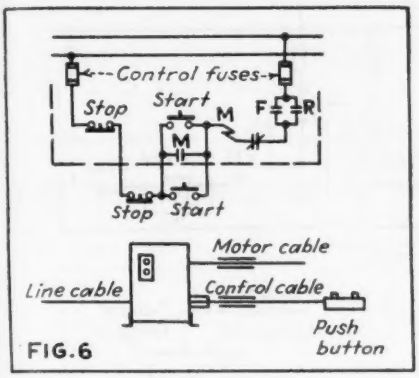


FIG. 6

Momentary Contact—Full Voltage Remote Control Plus Local Control

Advantages:

1. Undervoltage protection same as for Fig. 5.
2. Full control from any remote point where external button is located or at the starter.
3. If remote control only is required, button in the starter can be eliminated.

Disadvantages:

1. External pushbutton circuit must be protected by hose if for Class BM application.
2. External control circuit is fused.

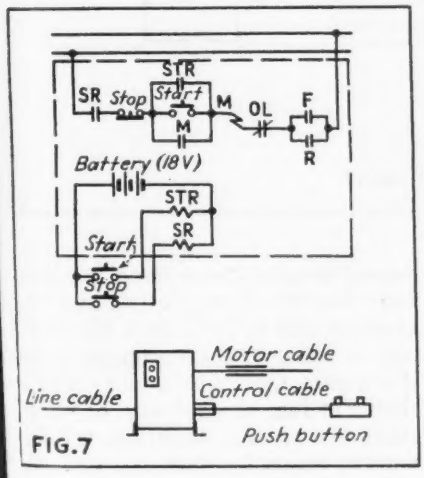


FIG. 7

Momentary Contact—Low Voltage Remote Control Plus Local Control

Advantages:

1. Undervoltage protection same as Fig. 5.
2. Full control from any remote point where external button is located or at the starter.
3. If remote control only is required, button in the starter can be eliminated.
4. No protective hose required for external control circuit.
5. No fuses required for external pushbutton circuit.

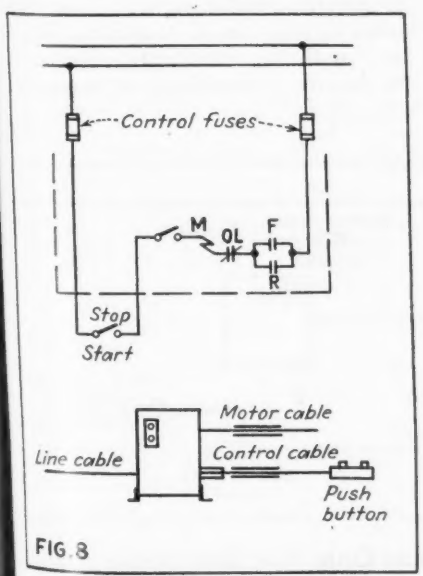


FIG. 8

Maintaining Contact—With Remote Control

Advantages:

1. Control automatically restarts on return of the power.
2. May be stopped or started from remote point.
3. If remote control only is required, button in the starter can be eliminated.

Disadvantages:

1. Danger to operators on unexpected restart.
2. Danger of damage to motor and control on stalled condition if overload relay is automatic reset.
3. All motors on the line try to restart at the same time.
4. Full-voltage hose-protected cable must be used if BM.
5. External control circuit is fused.
6. In general, control must be started and stopped at one point only. It cannot be stopped at starter and started at remote station, or vice versa, without the addition of more complicated and expensive wiring and devices.

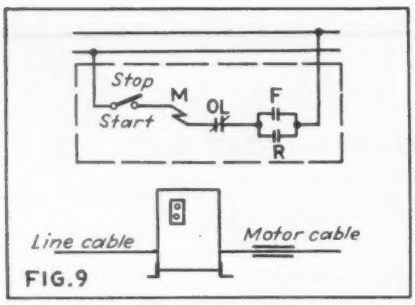


FIG.9

Maintaining Contact—Pilot Device Built In

Advantage:

1. Control automatically restarts on return of power.

Disadvantages:

1. Danger to operators on unexpected restart.
2. Danger of damage to motor and control on stalled condition if overload relay is automatic reset.
3. All motors on the line try to restart at the same time.
4. Operator must be at control location to stop motor.

SIMPLE SEQUENCING

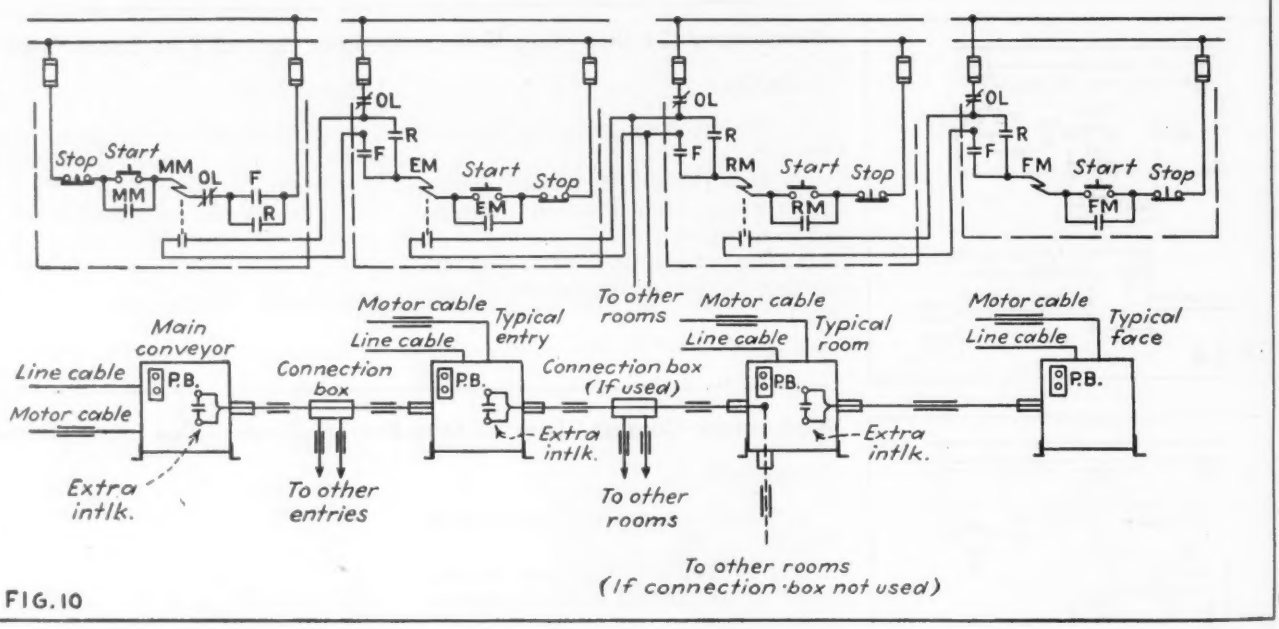


FIG.10

Momentary Contact—Built-in Pushbutton

Advantages:

1. If any given conveyor shuts down, all inby feeders are shut down, thus preventing pile-up of coal.
2. After shutdown, it is necessary to restart each inby conveyor by pushing the button. Under normal operating circumstances this means that the inby conveyors will not restart simultaneously. This prevents large voltage dips and momentary overloading of the power system and usually results in a saving in copper.
3. Any conveyor may run in reverse regardless of shutdown outby.

Disadvantage:

1. Operator must be at controller to restart after shutdown. **Note:** To eliminate Disadvantage 1, a remote control system as shown in Fig. 6 or 7 can be utilized for each starter. This will permit locating the external pushbutton where it will be convenient to the operator, and will eliminate the necessity of going to the starter to restart the motor. One such arrangement is shown in Fig. 11. It should be understood that specific conditions will dictate the extent to which it is desirable to provide remote control. The electrical circuits are as shown in Fig. 6 or 7 with the modification necessary to provide interlocking as shown in Fig. 10.

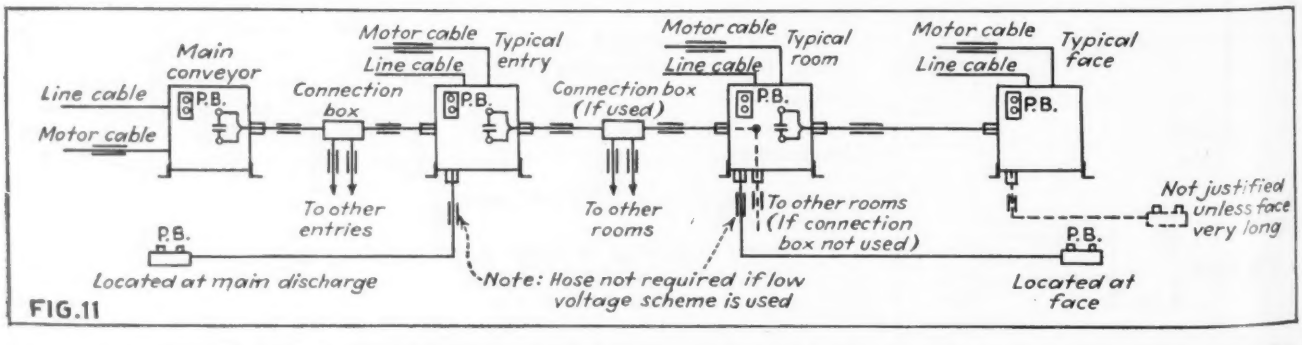


FIG.11

Momentary Contact—Built-in and Remote Pushbutton or Remote Pushbutton Only (See Note Under Fig. 10)

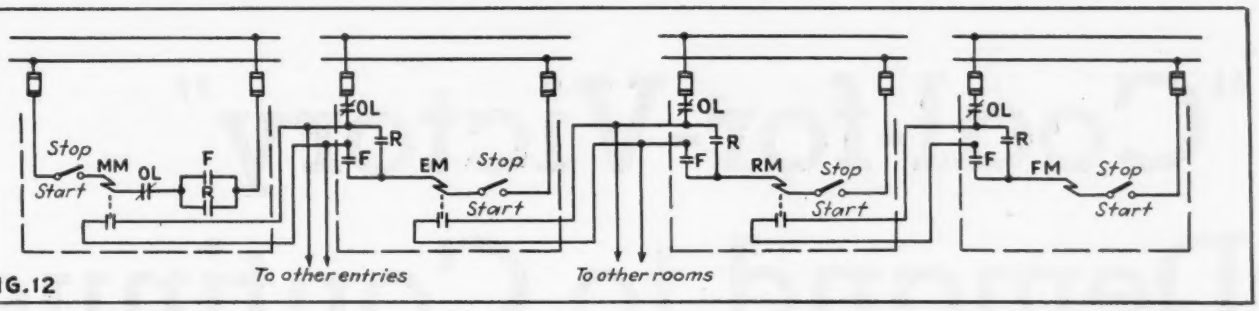


FIG. 12

Maintaining Contact

Advantage:

1. If for any reason a given conveyor with its feeder conveyors shut down, all will restart automatically when conditions are restored to normal without attention from the operator.

Disadvantages:

1. Because all motors tend to restart at once, a large starting load is put on the power system. In general this will mean a considerable increase in copper.
2. If, during a shutdown of, say, the main conveyor, it is desirable to carry tools or equipment into an entry, care must be taken that the room conveyors are shut off to prevent the latter from discharging into the reversed entry conveyor. This must be done by the operator, either at the room conveyors or by remote button as shown in Fig. 8.

TIMED SEQUENCING

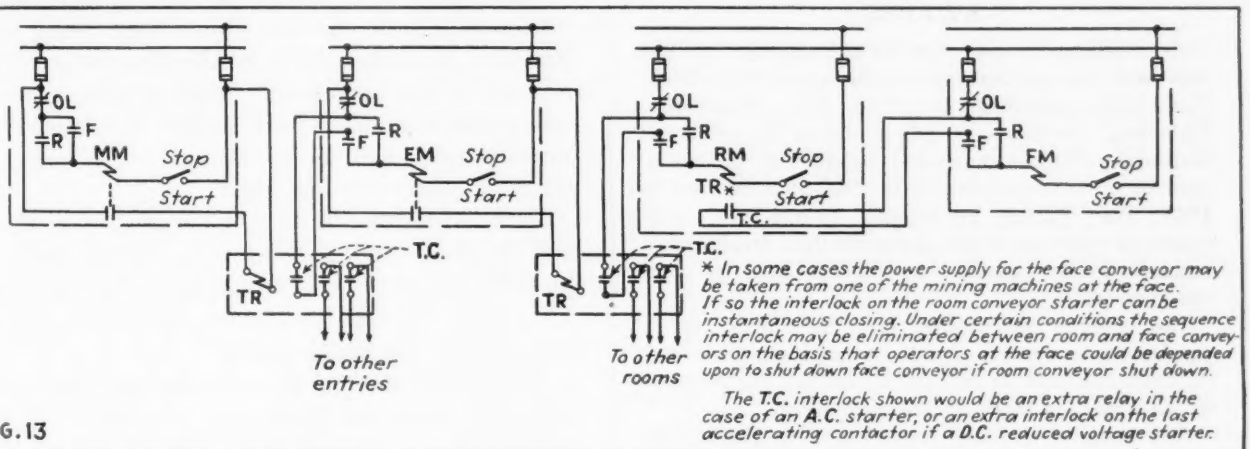


FIG. 13

* In some cases the power supply for the face conveyor may be taken from one of the mining machines at the face. If so the interlock on the room conveyor starter can be instantaneous closing. Under certain conditions the sequence interlock may be eliminated between room and face conveyors on the basis that operators at the face could be depended upon to shut down face conveyor if room conveyor shut down.

The T.C. interlock shown would be an extra relay in the case of an A.C. starter, or an extra interlock on the last accelerating contactor if a D.C. reduced voltage starter.

Maintaining Contact

Advantage:

1. Since the motors will now restart one at a time instead of all together, the starting load on the power system is reduced. In general, this will make possible a considerable saving in copper.

Disadvantage:

1. Complicated and expensive installation.

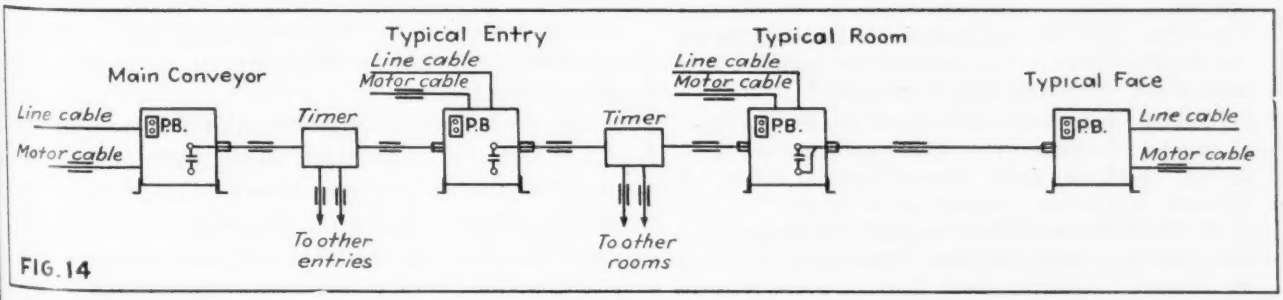


FIG. 14

Momentary Contact

IT IS ASSUMED (as pointed out under Advantage 2, Fig. 10) that with a momentary system the chances of more than one motor being started at a time are remote. However, if a timed sequence is necessary, it is feasible with the physical arrangement shown in the lower portion of Fig. 10.

"Coal-for-Victory" Demand to Continue

Need for Large Tonnages Likely to Continue Well Into 1945 Even If Germany Is Beaten— Industry Can Meet 1944 Quotas Only by Intensification of Efforts in Final Weeks

ABOUT THE "COAL-FOR-VICTORY" AWARDS

Two "Coal-for-Victory" awards are offered by *Coal Age* with the support and cooperation of the Solid Fuels Administration for War. The "Production Efficiency" award will go to mines or collieries increasing their fresh-mined production per man-shift by 10 percent or more in 1944 as compared to 1943. The "Victory Production" award will go to mines or collieries which increase their fresh-mined tonnage by 6½ percent or more in 1944 as compared to 1943.

The awards are offered both as a stimulus to production to meet the nation's huge wartime coal requirements and as recognition for the contribution which coal has made to the war effort.

Any mine or colliery having a War Production Board serial number and which was in production in 1943 and 1944 is eligible to enter for both or either of the awards. Certificates will be awarded both to winning mines and to individual members of their supervisory staffs.

COPIES of the rules and conditions of the awards are available from *Coal Age* in reasonable quantity at no cost.

APPLICATION BLANKS will be mailed to mines and collieries next month. They are short and simple. A sample was reproduced in the October *Coal Age*. Officials may find their task of filing for the awards easier if they examine the sample blank now to see what data will be required.

JUDGES also were announced in the October *Coal Age*. They are Dr. R. R. Sayers, director, U. S. Bureau of Mines; Dean Edward Steidle, School of Mineral Industries, Pennsylvania State College; R. Y. Williams, consulting engineer, Pottsville, Pa.; Carl Scholz, mining engineer, Charleston, W. Va.; and Harold L. Walker, head, Department of Mining and Metallurgical Engineering, University of Illinois.

BADGES for presentation to employees will be made available by *Coal Age* to winning mines at cost. A replica of the design was carried in the October *Coal Age*, and order blanks will be included with the application blanks.

"IT'S ALL OVER but the shouting."

How many times in the past few months has one version or another of that phrase been heard on the American production front as Allied troops press grimly forward on the battlefront? Some at home may think that production drives such as the "Coal-for-Victory" award program will not be necessary much longer. But there are others who disagree.

Prime Minister Churchill, General de Gaulle, General Marshall, Admiral Nimitz, and GI Joe don't think so. Their plea is for more and more production at home. They know the war has not yet been won. To them "it's all over but the shooting."

The fact is that coal in enormous quantities will be needed to fuel and power the war effort for many months after the winners of the 1944 "Coal-for-Victory" awards have been decided at the end of the year. No one engaged in war industry or in supplying the power that keeps it going can afford to let up for a minute.

Even though Germany should be defeated by the end of this year—still a hope although by no means a certainty—the best estimates are that industrial cutbacks will be no more than some 40 percent. Emphasis will be shifted from the types of equipment and munitions best suited to defeat Germany to those for what everyone agrees will be the long war against Japan. Coal will continue to supply the needs for all, no matter where the emphasis lies.

Dr. C. J. Potter, Deputy Solid Fuels Administrator for War, has been quoted as saying that a cutback of 40 percent will mean no more than a 14, or at the most, a 20 percent cutback for coal. Obviously, any cutback will not come all at once but will be spread out over several months. The result is that coal must continue to produce at the present record-breaking rate for some months to come—certainly until the end of the coal year next March 31.

Let's take a look at that production.

In October both bituminous and anthracite were ahead of their quotas on the basis of the calendar year.

But anthracite just met and bituminous was behind its quota on the basis of the coal year. It was still apparent, barring unforeseen circumstances, that many mines and collieries would be able to qualify for *Coal Age* "Coal-for-Victory" awards. But it was beginning to appear doubtful that the industry as a whole would make its 1944 goals unless production in the final two months of the year is materially increased.

In the first 42 weeks of 1944, bituminous coal, to reach its goal of 626,000,000 tons, should have produced 505,600,000 tons. Actually, estimated production was 506,405,000 tons for that period, or 805,000 tons beyond requirements—less than one working day's output. Anthracite showed up slightly better, its goal for that period being 52,500,000 tons and its actual production 53,032,000, a difference of 532,000 tons, or over two days' normal production.

But the margins were dangerously thin. Important holidays lie ahead, scattered labor troubles continue.

On the basis of the coal year, the picture was considerably worse, and in view of the expected need for maximum tonnage until next spring, if not longer, those figures became increasingly more important. If, as Churchill and other leaders say, the collapse of Germany cannot be anticipated until some time in 1945, coal must be available until at least April 1 in the same quantities as in 1944.

Here is how the coal-year picture looked after the first half of the year's production, the 26 weeks from April 1 to Oct 1:

Bituminous in that period should have produced 313,000,000 tons. It actually produced 309,700,000 tons, or 3,300,000 less than estimated requirements. Anthracite should have produced 32,500,000 and met its goal with 32,521,000 tons.

Those figures, of course, include the summer slump and a number of major holidays. They do not include the big production months of January, February and March, when coal can be expected to make up some of the deficit. But they do show that a tremendous task lies ahead of the industry.

There is no doubt that coal has its work cut out for it. It's far from "all over but the shouting." Even the defeat of Germany will not take much of the pressure off the industry. War material in vast quantities must still be supplied for the struggle against Japan—a struggle of ships, planes and transport—in all of which the demands on coal will be just as great as, perhaps greater than, they were in the European phase of the conflict.

In addition, as quickly as industry is freed of its war obligations it will turn to the production of long exhausted civilian goods. Coal will be needed for the task of reconversion just as much as it was needed for the task of war production.

All this means one more challenge to the ingenuity and energy of the industry. Coal will not—cannot—let down in its drive for more production until the shooting is all over and the shouting can really begin.

12 Steps to Bigger Tonnage

Although but a few more weeks of production remain in 1944, there still is a big job ahead in 1945 and it is not too late for coal companies to review again the major phases of operations to see if they are doing all they can to get out the greatest possible tonnage. Some of the accepted methods of attaining that goal are summarized in the following questions:

1. Has the most modern, high-capacity equipment been installed and is it being used to the fullest possible extent?

2. Has an effort been made to reduce travel time so that productive time may be increased?

3. Have mining operations been concentrated into the smallest possible area?

4. Are there sufficient substations close enough to the working places so that there is always good voltage at the face?

5. Has a supply system been worked out so that parts and materials are always quickly available and in sufficient quantity at the working places?

6. Is machinery being properly maintained so that both it and the crew are working instead of waiting for repairs to be made?

7. Has territory been laid out so that there is always an adequate supply of coal to keep loaders and conveyors working at capacity?

8. Is sufficient attention being paid to face preparation so that "loadability" of the coal is kept at a maximum?

9. Has transportation been studied to obtain shortest possible changing distances and insure an adequate supply of mine cars at all times?

10. Have preparation methods and clean-up practices been examined to see that a minimum of coal is left in the mine or goes onto the refuse dump?

11. In stripping, has high-capacity, modern equipment been installed, and has strict attention been paid to drainage, overburden preparation, haulage and maintenance to remove burdens on production?

12. Despite all the other problems confronting the staff, is the most scrupulous attention still being paid to safety?

STRIP POWER

Repays Stress on Efficiency and Safety

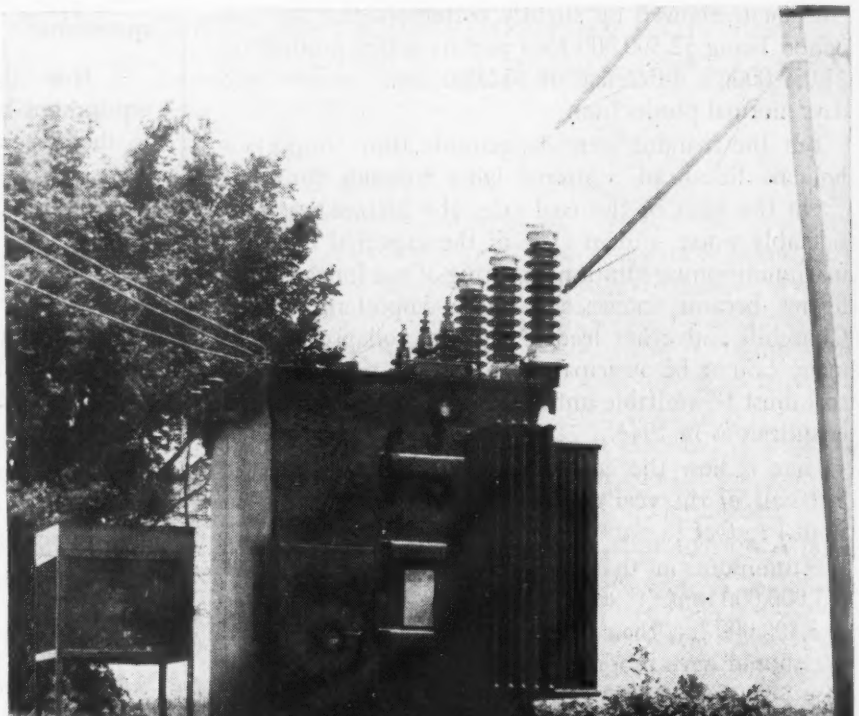
Cable Care Returns Dividends—Unit Substations a New Power Source Promising Many Benefits—Weatherproof Units, Capacitors and Lightning Protection Promote Efficiency and Safety

By FRED W. RICHART
Assistant Editor, Coal Age

IN A COUNTRY netted with transmission lines, almost every mine has the choice of generating its own power or tapping the high lines. From a power point of view there is no valid reason why either method should not yield the desired results. From a business point of view it will depend largely on the size of the coal property, on the local conditions and on the willingness of the management to adopt power-production methods. Strip mines both generate and buy, with the latter the usual practice.

The present standard 4,000-volt grounded "Y" system of electric-power distribution into and around the mine, rather than 2,300-volts delta, is based on very good reasons. It is cheaper to install because there is less copper in the conductors, while other equipment and accessories cost no more. It is less trouble for the operator because high-voltage cables are lighter, easier to handle and less susceptible to damage in moving. The system is only 2,300 volts to ground, and the grounded neutral lends itself perfectly to certain safety schemes; for example, the use of resistor ground-protective devices which limit to low figures the voltage to which workmen may be exposed in case of a fault in cable or motor.

The higher voltage offers a further advantage in that potential at motor terminals is likely to be nearer the rated figure. Moderate overvoltage is much less damaging to electrical equipment than is overcurrent. The latter is bound to occur when voltage is low. Even 4,000-volt cables supplying power to 30- and 35-yd. shovels are No. 2/0, weigh 2 tons per 1,000 ft. and are difficult to move without damage. One electrician remarked: "We tear up our cables just moving them around," and that was in the day of good rubber.



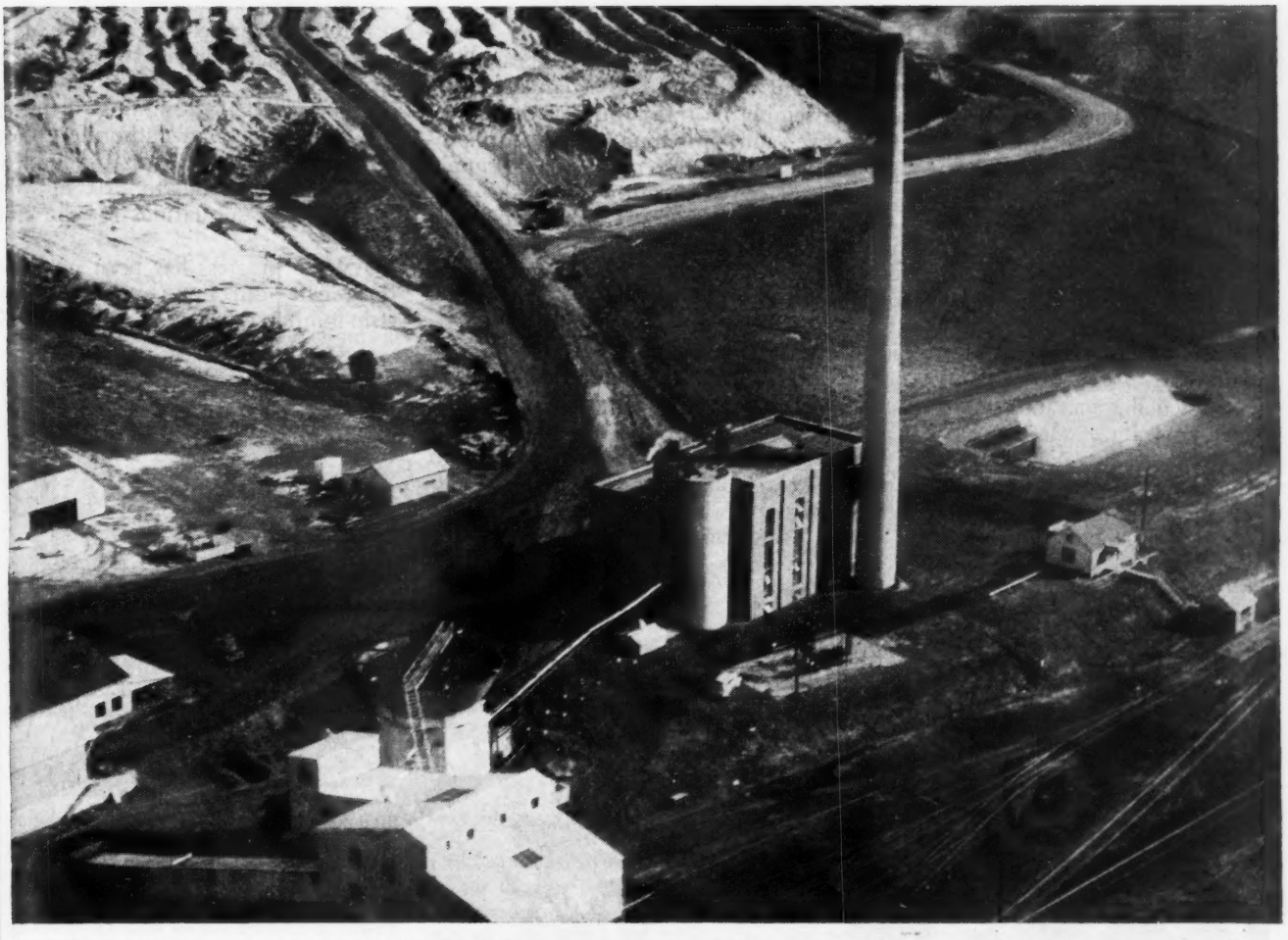
This modern 3,750-kva. unit substation supplies 4,000-volt power to a large strip mine. Note the ground resistor at one side. A similar 2,000-kva. station powers the washery and liquid-oxygen plant.

Actual voltage from power lines frequently runs up to 4,400 or 4,600. This is better from every point of view than 10 percent undervoltage. Practically all switching equipment and high-voltage cables used about strip mines are designed for 5,000 volts or more, so there still is a good margin for safety. All transformers have a high reserve to withstand surges and may have both high and low taps for adjusting voltages off standard.

Practically all preparation plants are driven by 440-volt a.c. power, and that voltage is becoming the standard for pumps and drills in the pit. Standard induction motors are wound for 220/440 volts, changeable with a screw driver and tape. Controls for 440 volts are smaller and somewhat lower in cost than for 220 volts. All low-voltage cables are rated at 600 volts, so there is a comfortable margin of safety when used in 440-volt service. Also, smaller cables can do the work and thus the cost is reduced.

Two methods of transmitting power to the pit are used. Possibly the most common is by pole line from the substation to a line parallel to and some 1,000 to 1,500 ft. ahead of the box cut, with laterals every 800 to 1,000 ft. to the cut. As stripping progresses, the laterals are shortened until a new parallel line must be run with a new set of laterals.

Good practice involves terminating the laterals with disconnects so that



Power for one strip operation is provided by this 2,600-kw. steam plant operating on minus ½-mm. coal salvaged from washery slurry.

cable attachment for switch houses or to 4,000-volt machines may be made "cold" as a safety measure. Porcelain primary cutouts are popular and safe for this purpose. They may combine the functions of fuses and disconnects. Oil circuit breakers also are used for "killing" connections.

From the lateral-line terminal a wide variety of schemes is used in serving the stripper, loader and field substations. Seldom are any two installations alike, so no recognized standard has been developed. Whatever the general scheme, switch houses, switchboxes and transformers are on runners or wheels to make them portable, and the cables are plugged in so that they may be disconnected quickly and moved by tractor to the next lateral. Usually the transfer of one connection or machine does not interfere with the operation of other units.

At some mines switch houses are in the pit instead of on the highwall. This permits reducing the length of the shovel cable and results in cutting cable-moving time to a minimum —in one mine to 15 minutes or less for a stripper. This short trailing cable, about 300 ft., has another big advantage where reels are employed. Little cable need be wound on the reel to keep it out of the way. This advantage will be appreciated when it is recalled that as few as four layers on the reel cuts cable capacity to 35 percent of rating. That suggests the use of smaller cables and less work making changes.

Second Method: Pole Lines

The second method of transmitting power is by pole line to a point near the pit, where a highwall cable is connected through a pothead. This cable, in 800- to 1,000-ft. lengths, is strung out along the working cut. Switch houses or junction boxes equipped with disconnects, oil circuit breakers or fuses, join the ends of the cables and provide connections to the shovels in the pit and transformers on the highwall. This method of distribution seems to be gaining in popularity, especially in irregular pits with shallow stripping where frequent moves are necessary, but are hampered by war needs. Details vary widely, but, in general, workmen are protected by killing cables before they are handled. The advantage is in the portability of cables. Some users also point to a substantial reduction in voltage drop as compared to pole lines.

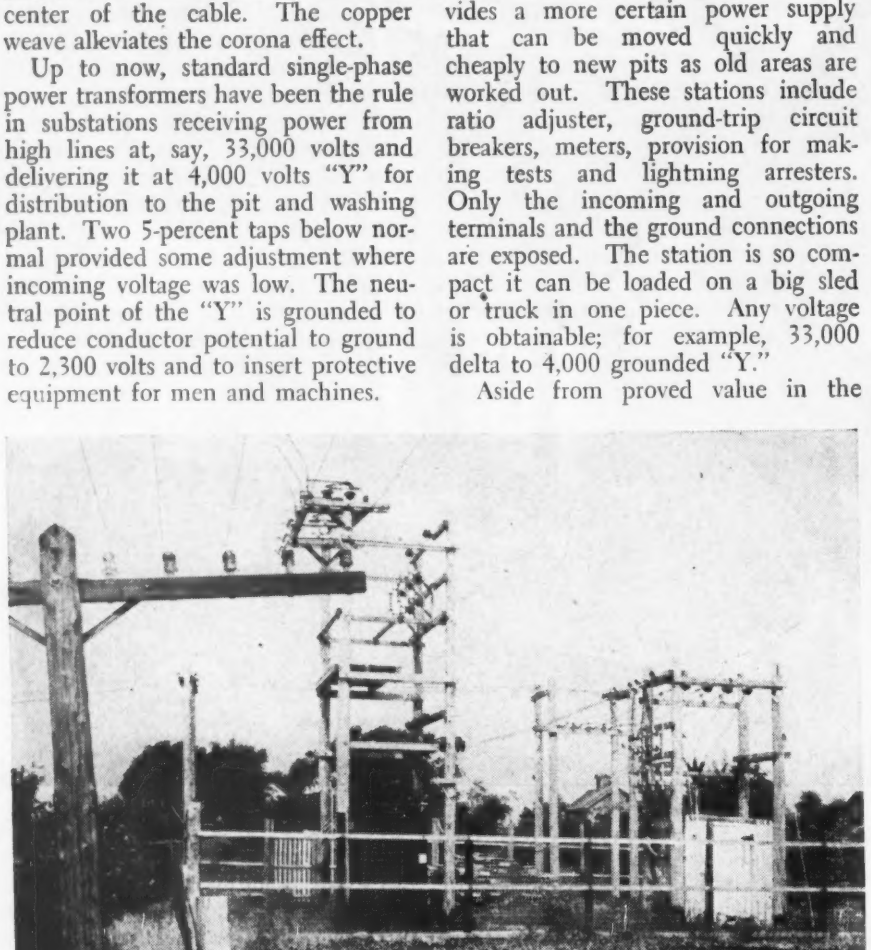
Two types of cables are available for use along the highwall: parkway and wire-armored. Portable cables have 60 percent rubber gum in the outer jacket to resist abrasion from frequent dragging around. Parkway cables, which are moved only occasionally, have a thinner jacket with but 40 percent of rubber gum. Wire armor protects the rubber jacket but adds to the cost and increases splicing difficulties. However, some mining companies consider it worth the added cost and trouble.

Any cable is damaged if run over and the rubber bruised or the wires kinked. A rubber cable often does not show these abuses, but an armored cable does. The armor wires will spread like a bird cage and never return to place. Much of the armor's protective value then is lost.

All 4,000-volt strip-mine cables carry a fourth conductor—the neutral. This is grounded on the shovel and is continuous through a fourth wire on the pole line to the substation. The actual form of this fourth conductor may vary from three bare conductors

laid in the interstices between the insulated power conductors to a copper weave over each power conductor. It may include both wires and weave, and even an added wire core in the center of the cable. The copper weave alleviates the corona effect.

Up to now, standard single-phase power transformers have been the rule in substations receiving power from high lines at, say, 33,000 volts and delivering it at 4,000 volts "Y" for distribution to the pit and washing plant. Two 5-percent taps below normal provided some adjustment where incoming voltage was low. The neutral point of the "Y" is grounded to reduce conductor potential to ground to 2,300 volts and to insert protective equipment for men and machines.



Wartime substation. The frame of wood poles is tied together by sawed bars.

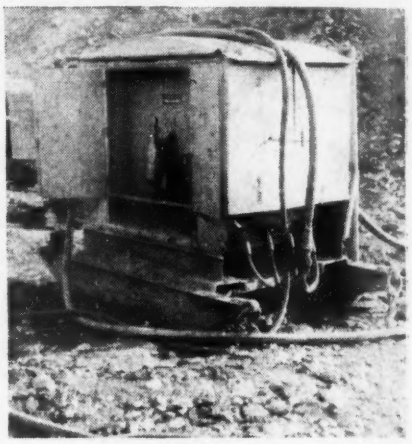
This type of substation, now in general use, is bulky, requires a lot of exposed wiring and is expensive to install or move. Ten years or more ago manufacturers brought out designs of "unit substations," in which a 3-phase transformer, switching equipment and wiring were inclosed in one metal container. Power utilities have been using these to advantage. They greatly reduce bulk, only outside line connections are exposed, they may be picked up and moved in minimum time and installation cost is nominal.

The stripping industry has very recently "discovered" the unit substation and a few have been installed. It is one of the more important improvements in power distribution that have appeared in recent years. The complete unit assembly of transformer with protective and switching equipment provides a more certain power supply that can be moved quickly and cheaply to new pits as old areas are worked out. These stations include ratio adjuster, ground-trip circuit breakers, meters, provision for making tests and lightning arresters. Only the incoming and outgoing terminals and the ground connections are exposed. The station is so compact it can be loaded on a big sled or truck in one piece. Any voltage is obtainable; for example, 33,000 delta to 4,000 grounded "Y."

Aside from proved value in the utility field, the unit substation has so many advantages it must soon become a standard piece of apparatus for strip mining. But the idea has a much wider application for both strip and underground mining. Pumps, drills and air compressors usually are driven by 220- or 440-volt motors, while much a.c. underground mining equipment uses 220-volt power. The usual low-voltage portable field or underground substation is an assembly of three single-phase transformers connected by dangling wires which are more hazardous for men and machines.

There are exceptions where the wiring or the whole assembly is inclosed for safety reasons. In some stations control and protective equipment is added. Practically no two are alike, so there is no recognized standard. Manufacturers and mining men, in the opinion of many authorities, must recognize the need for a complete line of 2,300/4,000- to 220/440-volt portable unit substations for the coal industry.

A little progress has been made in the right direction. One Kansas strip-mining company has in use 15



Sled-mounted 4,000-volt switching station on the coal in the pit. The operating handle of the oil circuit breaker appears in the open door. The breaker cuts off power to trailing cables and automatically opens on shorts or grounding of a phase wire. Cables are plugged in.

or more field substations built around 3-phase transformers. They eliminate loose interconnecting wiring and reduce space and weight. One manufacturing company has offered a complete unit substation for underground service which includes a 3-phase transformer with switching and protective equipment.

While the conditions and requirements of underground and strip mining differ, particularly in voltage delivered to operating machines, there is enough in common to justify a basic design that could serve both. Such switching and controls as need to be different can be assembled around this common base. Modern trends are bringing conditions closer together.

Much could be written about the types of motors that have proved suitable for various strip-mine applications. While the squirrel-cage motor, a simple, strong unit, has a wide application, perhaps it is best to begin with the highwall and follow through by application rather than by types of motors. Some applications call for very special equipment.

Churn drills, rotary drills, air com-

pressors and pumps all require simple, strong splashproof motors. The squirrel-cage motor meets these requirements. Price being the same for sleeve and ball bearings, there is no argument for the former. Ball bearings stand rough service the better. Across-the-line starting has practically eliminated compensator control and is much simpler, cheaper and better. The jarring of churn drills is so hard on standard controls that one mining company has gone to 3-pole fused knife switches. Standard fuse links will not stay put, so the correct size of copper wire is used in their stead. Tables giving the fusing currents of copper wires may be found in engineering handbooks.

Controls for other outdoor low-voltage applications should be of the weatherproof pushbutton-operated air-circuit-breaker type correctly calibrated for the load. No overload device will protect unless adjusted to the load of the motor.

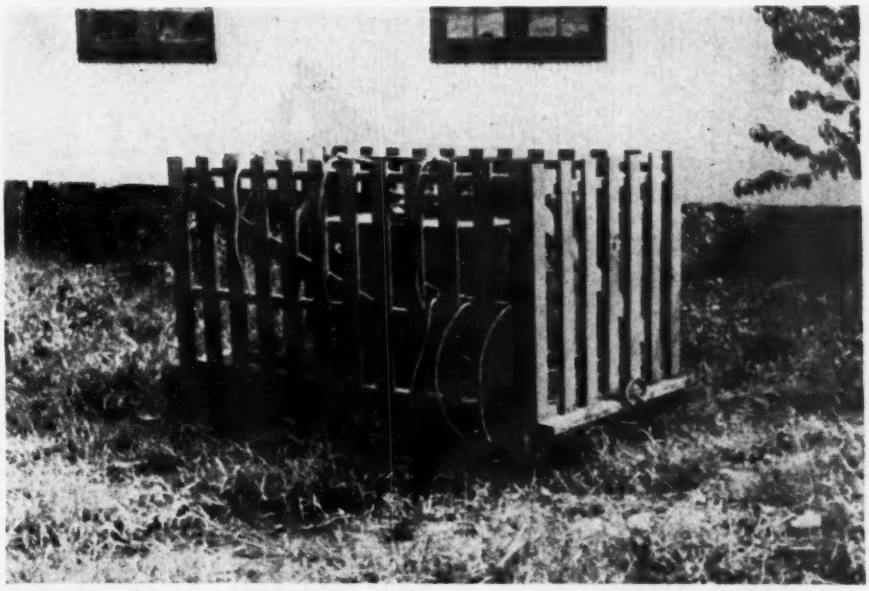
Heavy shovel equipment is special. As a rule, small auxiliary motors are standard squirrel-cage units, but are not splashproof. They are satisfactory for such indoor applications.

Motor Size Important

Some motors on the individually driven caterpillars of stripping shovels have been too small for the speed they were geared to travel—a point worth watching. Copper-oxide rectifiers to supply current for d.c. motors for this service also have been too small at times. Certain conditions may cause trouble, such as hills in the coal seam, deadheading from one end of the pit to the other, deadheading from one mine to another, and the condition of the road. It is necessary to remember that such motors are intermittently rated and are not intended for highballing across the country.

The buyer should be aware of the conditions in his field. The manufacturer will furnish appropriate equipment if informed of the conditions and will supply super equipment to meet unknown contingencies if requested.

Use of the Ward Leonard system of operating strippers and modern loaders is a well-founded standard that may be improved but is not likely to be displaced. The new "Amplidyne," "Rototrol" and similar controls for this system offer advantages in operating efficiency and maintenance cost that cannot be overlooked. Certain details have been greatly simplified and improved by these new controls.



This low-voltage field substation for drilling and pumping is a single-phase transformer guarded by a low wooden fence. The only connections exposed are three incoming and three outgoing lines, making for simplicity and safety.

Normally, it is sought to maintain power factor at a high level to reduce power cost. But conditions do prevail where it is more important to maintain uniform voltage rather than keep power cost at a minimum. Because of its fast response to control, the amplidyne is used successfully to stabilize fluctuating line voltage and thus maintain production. Another result is keeping down line losses and demand charges by providing a good power-factor at peak loads. This is an added use of the amplidyne.

The practice of using the synchronous motor that drives the stripper for correcting power factor throughout the operation is neither good engineering nor good economy. The synchronous motors on older shovels were 80 percent power factor. Where the line voltage was not too high, such motors had some capacity for correcting power factor but not enough margin to correct the washery load.

Present general practice is to use synchronous driving motors of 90 percent power factor. Thus, there is no capacity to correct poor power factor beyond the pit. This is wise and sensible. It permits reducing pole lines and cables to the pit to a minimum and eliminates undue overloading of the motor.

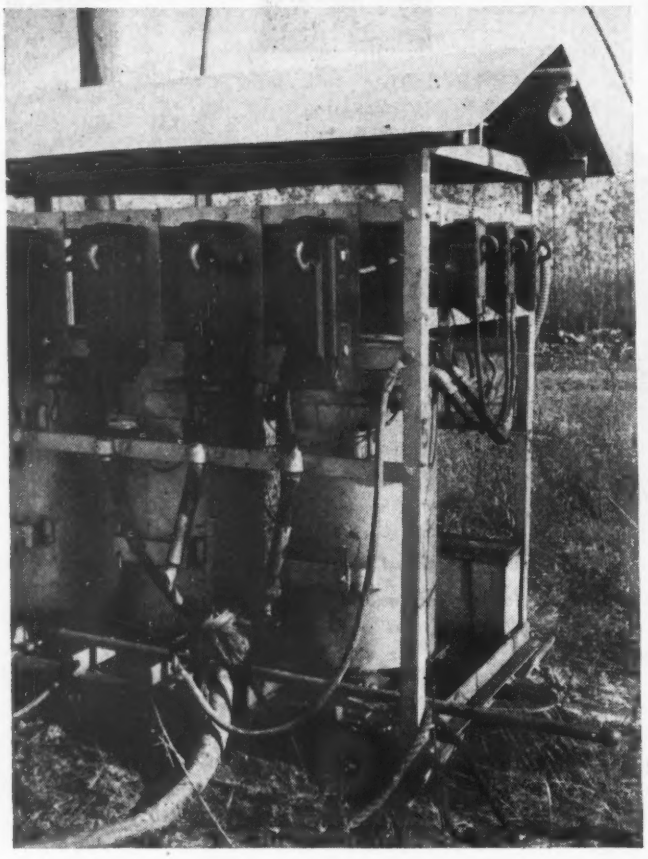
Recent stripper designs with two hoist and two swing generators have been greeted as moves in the right direction. Nominal voltage is limited to 250 or 300, reducing the tendency to flash over the brushes. In the change total generator capacity has been increased. Some early machines of this type have been remarkably free from electrical troubles. Some single-generator machines have had too little hoist power in the generator and have given more or less trouble.

Recent employment of 1,800-r.p.m. motor generators has not worked out too well in some cases. There may have been factors other than speed, for much higher speeds have been successful on other types of large machines. High generator speeds have certain theoretical advantages for shovel applications and, perhaps, the cost may be favorable. Neither of these considerations outweighs ability to handle the toughest job in mining.

Present-day mill-type d.c. motors for the hoist, swing and crowd motions of stripping and loading shovels are about all that can be asked. They were developed to meet the tough service of rolling mills and, when blown, are suitable for shovel work. A change in hoist-motor installation to relieve concentrated stress on the main hoist gear is proposed. If the difficulties of early kindred applications are avoided, this may prove to be an important advance.

Loading shovel capacities are tending up. Motor-generator sets take power at 4,000 volts and synchronous motors frequently are used. To conserve cab room, crowd and swing generators are combined into one unit. This all is reflected in expanding tonnage, economy and lower maintenance cost.

While fuses still have a place, they are rapidly being discarded in protecting small low-voltage general-purpose motors and for lighting service on both types of shovels. Automatic air-



Field substation delivering 4,000-volt power to shovels and 440 volts for pumping, highwall drills and other needs. Lightning arresters and primary cutouts protect the equipment. Cutouts for the stripper carry 200-amp. fuses.

This tractor carries a permanently attached tire rim for prevention of cable kinking in moving. All pick-up trucks at this operation are similarly equipped and little time is lost in calling for a vehicle when a cable must be moved.

circuit breakers afford overload and short-circuit protection and are safer than fuses. In addition, service can be restored promptly after interruption.

One successful trolley haulage system, in connection with truck gathering to a transfer station, indicates the possibilities for others. Forty-ton roller-bearing cars on a ½-percent grade against the loads are very feasible for up to a six-mile haul with 600-volt trolley and power supply in the center of the haul. Single transfer stations are handling well over 5,000 tons per shift.

There are many good reasons for the almost universal use of squirrel-cage motors in preparation plants. These include simplicity, adaptability to ready change from one type to another by the mere change of the rotor and, in some cases, one end shield; availability in all types of inclosure from open frame to explosionproof; and employment of the simplest control devices. The varied forms, such as normal torque, high torque and high slip, insure their fitting readily into most applications around a preparation plant. Except where variable speed is necessary or where exceedingly difficult starting conditions prevail the slip-ring motor rarely needs to be used.

Attention is directed to the possibility of eliminating trains of exposed or poorly inclosed gears by the use of gear-motors in which the gear train is compact, safely inclosed and splash-lubricated. The life of the gear train is on a par with that of the motor where manufacturers' recommendations are followed. That point is very important for certain applications.

Minimum protective inclosure of preparation-plant motors should be splashproof. In dusty or sloppy plants, particularly near dust-treating equipment (oil spray, etc.), motors must be totally inclosed if trouble is to be avoided.

Capacitor Usually Best

The use of synchronous motors in preparation plants may well be open to question. Usually such application would be for power-factor correction. If not dust- or, in some cases, weatherproof, they invite trouble. The logical power-factor corrector is a capacitor. The reasons are simplicity, high efficiency, long life and declining cost.

All electrical control equipment ought to be at least dustproof. In some cases, where there is much moisture or in calcium-chloride plants, it should be moistureproof. There are sound reasons. Coal preparation is neither perfect nor standardized and every plant faces continual changes forced by markets, new developments and increasing tonnage. It cannot be predicted when dust, moisture and chemicals may come into the picture. The only safeguard is real protection.

Another factor is the increasing use of relays in control devices. A relay is a tiny control device with miniature contacts under very light pressure which is expected to handle fractional currents without fail. Dust and corrosion can easily put them out of service. Only by keeping them clean in adequate inclosures can unfailing operation be assured. If a relay fails, equipment either stops or is injured.

Most lightning protection is cheap. For expensive equipment it is cheap at any price. Lightning arresters, backed up by capacitors and connected to good grounds, afford practically certain protection. No strip mine can afford to expose vital machines and cables to the ravages of lightning.

SAND PLANT

Features Vented Dryer in Bottom of Bin

Sand Drying Practically Automatic—Plant Is Steam-Operated and Vents Are Provided for Direct Moisture Escape—25 Tons Dried in 24 Hours—Construction Based on Use of Steel and Concrete

MINIMUM LABOR, ample capacity and reliability were the principal objectives in planning a new plant for elevating, storing, drying and loading locomotive sand at a large drift mine in the Pocahontas field. The principal features of the installation are shown in the accompanying illustrations. It was preceded by experimental operation of a dryer somewhat similar in design but constructed for temporary use only.

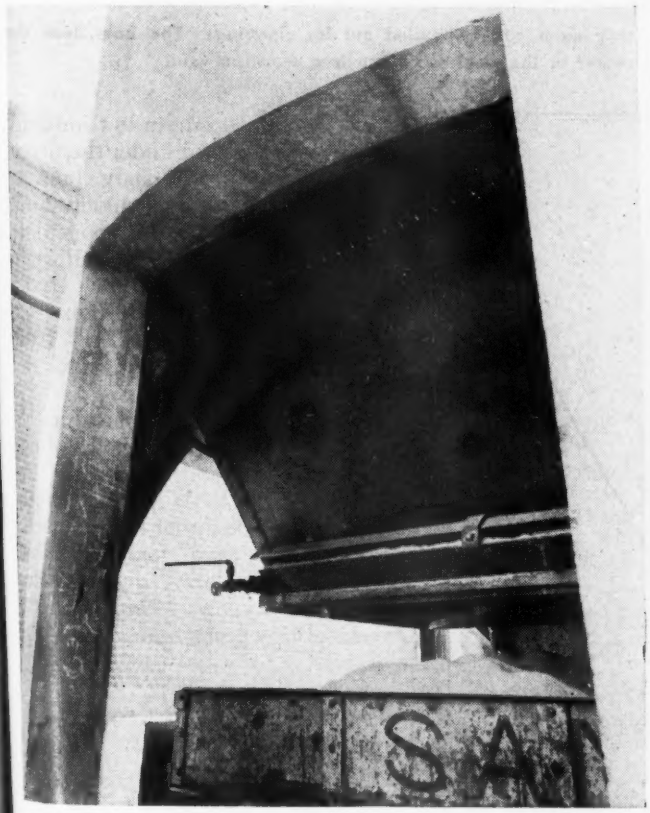
Sand is brought up the hill to the plant by motor trucks loaded from railroad cars by a clamshell. From a truck-dump hopper of steel sunk to ground level the sand is elevated to a 350-ton storage silo, the bottom of which is the dryer. The silo spans the dead end of a spur track leading from the supply yard. Height of the bottom of the dryer is 12 in. above the top of the mine car parked beneath to catch the sand as it dries and drops through. Location is next to a new brick building housing the lamphouse, office and bathhouse. Steam is required the year round for the latter. Consequently, the dryer was made to operate on steam and the one furnace and boiler has capacity to handle both loads.

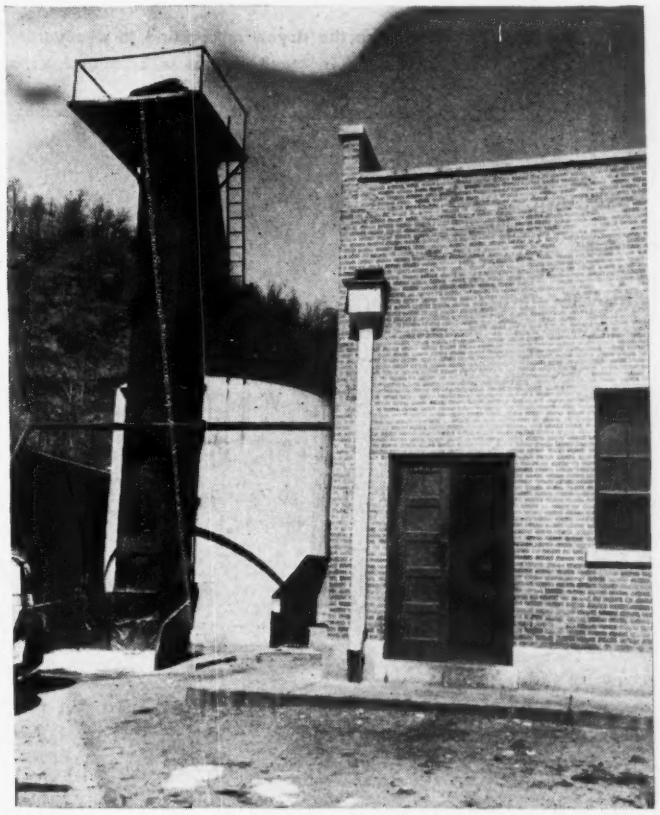
Moisture Escape Promoted

Arrangement of steam pipes and vents in the dryer to promote direct escape of moisture, thus minimizing the tendency for the vapors to pass upward and condense in the cold sand above, is the basis for the design chosen. As indicated in the drawing, the sand first passes between steam pipes spaced ½ in. apart, then between a bottom row on ¼-in. spacing, before it falls onto the ¼-in.-mesh screen that collects oversized particles of dirt.

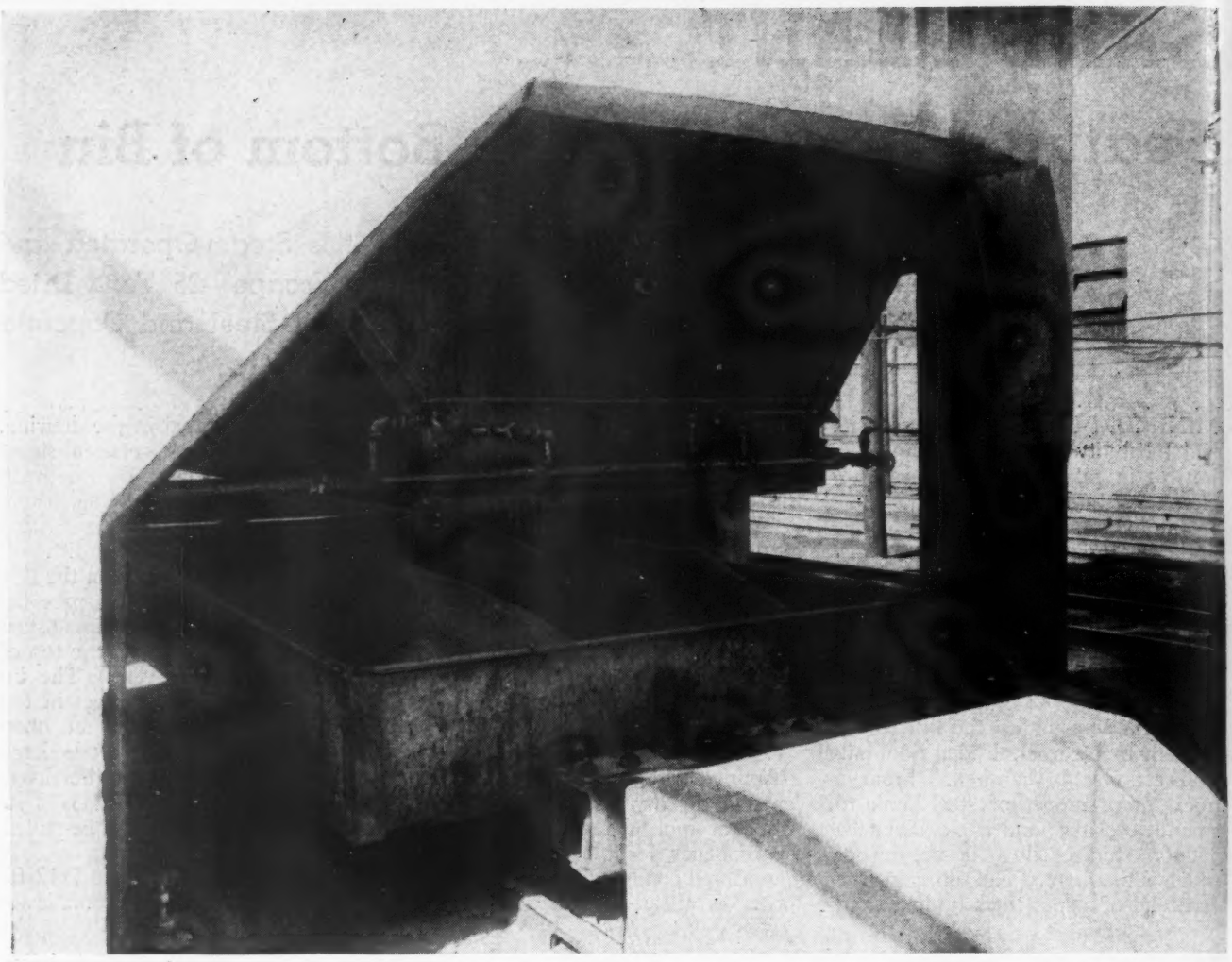
That sand filtering between the side pipes slides down the 2-in. space between these pipes and the sloping steel plate. A row of holes near the top of that space forms the vent. The inverted-V arrangement of pipes in the center tends to maintain an open space which is vented by two large holes, one in each end of the dryer. The bottom screen, which is 5x10 ft. and fashioned like a tray, can be pulled out endwise for cleaning.

Bodies of the sand cars are 7x12 ft. and a full load is received automatically

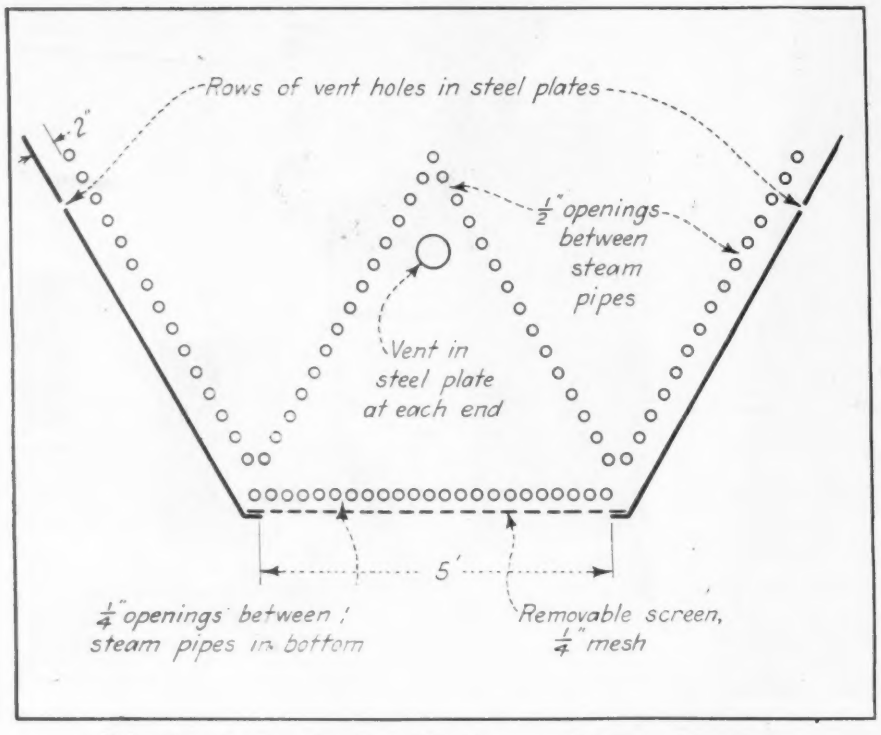




Left: View of sand dryer, indicating arrangement and spacing of steam pipes, screen tray and moisture vents. Right: Truck dump hopper, elevator and 350-ton-capacity raw storage silo are located next to the lamphouse. The dryer is the bottom of the silo.



This car, receiving sand from the dryer, is coupled to a concrete bumper block. The 5x10-ft. ¼-in.-mesh screen is arranged as a tray so it can be pulled out for cleaning. The hole near the center of the steel end plate is a moisture vent.


Rows of vent holes in steel plates
2"
½" openings between steam pipes
Vent in steel plate at each end
5'
¼" openings between steam pipes in bottom
Removable screen, ¼" mesh

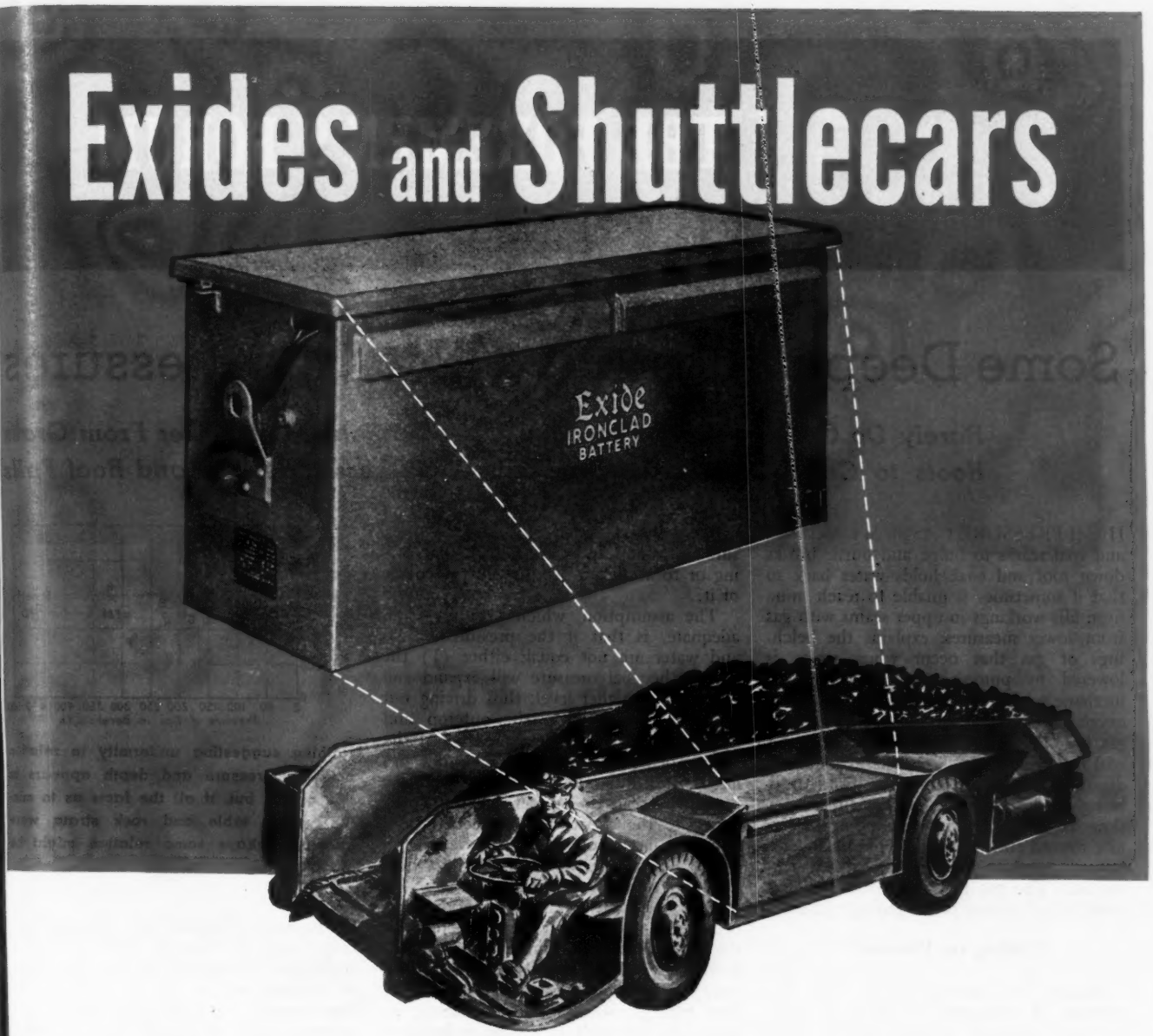
Holes along the top side of the side plate are additional moisture vents.

with little or no attention to trimming. The car, while parked under the dryer, is coupled to a stationary bumper block. This block is substantially built of concrete to preclude any possibility of damage to the lamphouse wall when cars are switched in and out. Under the dryer and for one additional car length the track is level, but from there on it is downgrade into the supply yard.

Drying capacity is approximately 1 ton per hour. In one 24-hour period of continuous operation the unit dried 25 tons. When the photographs were made a roof had not been put on the raw sand storage silo, but heavy rains had already demonstrated the need, so plans were being made to provide this protection from the weather.

◆

Exides and Shuttlecars



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THE FOREMEN'S FORUM

Some Deep Mines Have Low Gas Pressures

Rarely Do Gas Pressures Exceed Those of a Column of Water From Grass Roots to Coal—Compressd Gas Causes Outbursts, Belches and Roof Falls

HIGH-PRESSURE GAS often causes floor and coal seams to bulge and burst; breaks down roof and coal; holds water back so that it sometimes is unable to reach mine fires; fills workings in upper seams with gas from lower measures; explains the belchings of gas that occur when water is lowered by pumping and provides the methane which drives out and dilutes the oxygen in fire-sealed areas. Whether the gas found is such as still remains in the coal from extremely distant periods of coal deposition and later metamorphism, or is being produced at the present time by a slow day-to-day rise in maturity from lignite toward anthracite and from anthracite toward graphite is a matter much discussed. The gas in coal may come as a result of all phases of its geologic history.

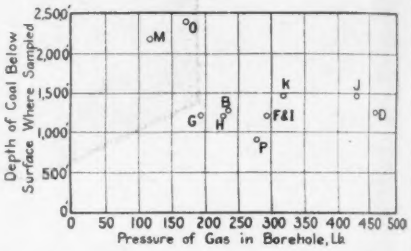
Ceiling on Pressure

Perhaps the current opinion that the pressure of untapped methane in coal measures increases proportionately with depth has some justification, but that is not the whole story. It is customary to put a "ceiling" on methane pressures, declaring that the pressure cannot exceed the load of a column of water of depth equal to that of the coal below the surface, and it seems a natural supposition, but, looking at the accompanying table and graph, that ceiling seems rarely or never to be reached, and there seems little agreement between the water-pressure theory and actual conditions, doubtless because there are other modifying causes besides depth from surface.

Because of the presence of ground water, the methane in the coal measure cannot escape until coal is mined, unless the gas in the coal has a pressure greater than that imposed by that water. Even theoretically the methane pressure could never be determined by the full depth from surface to coal. It would be rather the depth of the coal from the lowest long-sustained level of the upper surface of the ground water, and broadly speaking whenever, due to a drought, the deepening of streams, or the mining of a higher seam, the water level is lowered, the methane in the coal would be enabled to escape until the pressure of the water would equal the pressure of the methane. However, the pressure never appears able to reach that ceiling or to attain any consistent percentage of it.

The assumption, which data prove inadequate, is that if the pressure of gas and water are not equal; either (1) the gas in the coal measure will expand and extend to a higher level, thus driving out some of the water to the outcrop and thereby losing its own pressure, or (2) the water, being the heavier, will descend farther and, in so doing, compress the gas, but this it can do only if the water can penetrate the crevices. This penetration, however, it cannot always achieve.

An illustration will demonstrate how resistant some fine crevices are to the passage of water: Helium sometimes has been used instead of water to determine the *true* density of solid bodies. Water determines only the average density of the body, including both true rock and its finer crevices, which latter physicists, at times, do not wish to regard as being a real part of the body. So we term the specific density as determined by water as the *apparent* specific gravity. Helium by entering the finest and crookedest openings gives the specific gravity of only the solid part of the body. Evidently then there are crevices in solids into which water cannot wriggle and helium can.



Nothing suggesting uniformity in relation between pressure and depth appears in this graph, but, if all the facts as to mining, water table and rock strata were known, perhaps some relation might be established.

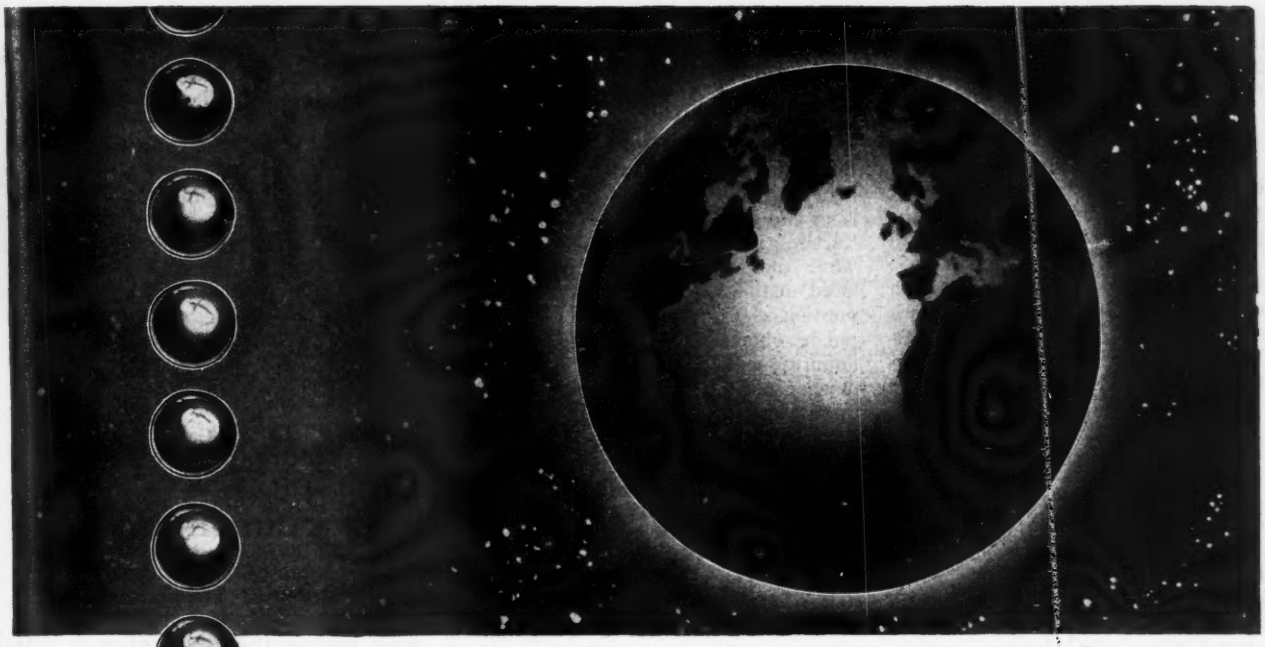
Frequently, the roof of a coal seam contains in places material, such as clay and shale, that appears to prevent the escape of methane and the passage of water. In consequence, it is conceivable that the gas pressure could be greater than the water pressure. On the other hand, some roofs may be so open that gas can pass up through the water with little resistance, permitting the gas pressure to be less than the load imposed by the water.

Mine water is heavier than distilled water, which weighs at 62 deg. F. (about mine temperature) 62.29 lb. per cubic

PRESSURE AND OUTFLOW OF GAS AT DIFFERENT DEPTHS

Name of Colliery (1)	Depth in Feet (2)	Water Pressure Assuming Water Extends to Surface (3)	Gas Pressure, Lb. per Square Inch (4)	Depth of Borehole, Feet (5)	Col. (4) / Col. (3) × 100 (6)	Quantity of Gas Liberated Cu.Ft. per Hour per Sq.Ft. of Surface Area of Gas Space (7)
(A) Elmore†			4.36	8.53		
(B) Eppleton*	1,260	551	235	47.0	42.6	5.927 (max.) 0.505 (min.)
(C) Eppleton, Hutton Bed†			36.14	46.90		
(D) Boldon*	1,268	555	461	32.0	83.1	3.899 (max.) 0.057 (min.)
(E) Balden, Bensham Bed†			71.41	31.85		
(F) Harton*	1,215	532	295	37.0	55.4	1.424 (max.) 0.174 (min.)
(G) Harton†	1,214	531	196.3	16.24	37.6	
(H) Harton†	1,214	531	230.44	27.55	43.4	
(I) Harton†	1,214	531	294.45	37.13	55.4	
(J) Celynen*	1,480	648	430	47.83	66.3	0.009 (coal extremely hard and compact)
(K) Celynen*	1,480	648	318	20.25	49.1	1.000 (coal very soft)
(L) Celynen†			68.32	54.48		
(M) Harris' Navigation*	2,169	949	116	26.75	12.2	0.191
(N) Harris' Navigation†			22.04	32.80		
(O) Merthyr Vale*	2,400	1,050	170	41.17	16.2	2.44
(P) Merthyr Vale*	900	394	280	49.75	71.1	Practically nil, water in hole
(Q) Merthyr Vale†			39.67	49.20		
(R) Hetton, Hutton Bed†			6.96	8.98		

* N. of E.I. of M. & M.E. June 17, 1944, *Coll. Guardian*, July 7, 1944, p. 2. † Coal Miners' Pocketbook, 12th Ed., p. 973.
‡ Figures for observations marked * are greatest pressures obtained.



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It can well be said that our way of life *depends* on the ball bearing—for most every mechanical device known to man, somewhere, somehow, has ball bearings in its family tree.

New Departure's experience, resources for research, imagination and advanced techniques have produced a truly fine ball bearing.

So . . . when next you buy or build some mechanical device, ask: "Has it New Departure Ball Bearings?"

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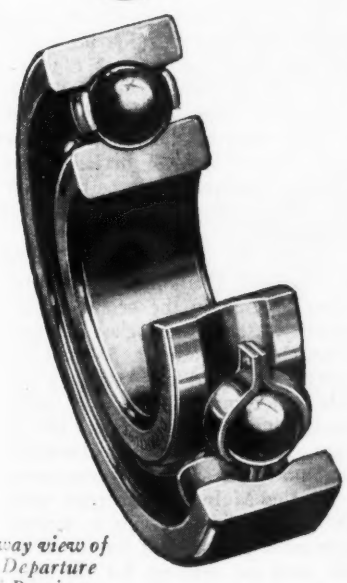

Cut-away view of New Departure Ball Bearing

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foot. Let it be assumed that the weight of coal-mine roof water is 63 lb. As a cube of a cubic foot capacity is 1 ft. high and 1 ft. wide in two directions, its base is 1 ft. square and comprises 12 × 12 in. or 144 in. Dividing 63, the weight resting on the entire base of 144 sq.in., by that number of square inches you get the weight of a 12-in. column of water with base of 1 sq.in. or for that matter of a crevice filled with water and one foot high if the water can travel in the crevice. This figure, 63 ÷ 144, is 0.4375. If the depth of coal seam is 1,000 ft., the pressure should be 437.5 lb., but it is never that much apparently and sometimes is much less.

Some of the data in the table accompanying this article are taken from an address presented by R. Williams, W. Jeffrey and A. Taylor to the North of England Institute of Mining and Mechanical Engineers at Newcastle-upon-Tyne. It shows pressures that vary widely with depth beneath the surface. The highest is that at Bolton Colliery, which is not very deep from a British standpoint—1,268 ft. With a hole 32 ft. long, the pressure is 461 lb., whereas 1,268 × 0.4375 is 554.85 lb. If the hole had been longer, if the pressure had not been lowered during the drilling of the hole, if the stopping were not so near the coal face, if it were entirely impenetrable, and if the gas had been given more time to fill the hole at its normal pressure, the higher figure possibly *might* have been approximated.

Coal's Thirst for Gas

The authors of the British paper quoted J. Ivon Graham as authority for the statements: (1) that the more easily a gas is liquefied the more readily it will be adsorbed or "dissolved" in the coal; (2) that the more mature coals, like anthracite, will absorb more gas than the less mature, like subbituminous coal; (3) that the quantity adsorbed increases when the pressure or concentration of the gas in the surrounding atmosphere increases; (4) that gases at a high temperature are adsorbed in less quantity than the same gases at a lower temperature; (5) that a coal that adsorbs gas rapidly will also liberate it rapidly if the pressure diminishes or the temperature increases, and (6) that a low-moisture coal will adsorb the most gas; that is anthracite proves more adsorbent than lignite.

•

Rear Line of Defense In Fire Fighting

When mine fires have to be fought, the first line of defense is direct fighting with water, rock dust and shovels, but in the time consumed for such defense is opportunity to prepare for fighting the fire by the second line—sealing. For this all necessary provision should be made, even to putting up brattices where they will not interfere with direct fire fighting and its safety. At least, plans should be laid so that there will be no delay when the time to retreat arrives and that there will be no lack of material for defense work. In this period also careful reconnaissance can be made to see if the maps are up to date in the area affected.

This wrinkle derived from practice in the present war may make the difference between safety and danger in sealing operations and between success and failure. Extinctive gases can be purchased and laid by while the fire is being fought by bare-faced methods. Nitrogen, made by compression as a byproduct of liquid oxygen, can be obtained with only 0.3 percent of impurity, and this impurity partly consists of neon and helium, which for use as extinctive gas is not impurity at all, because they are both incombustible gases.

More generally considered and used is carbon dioxide as a solid or as a gas. Dry ice, the solid form, both cools the fire and smothers it. Unfortunately, care must be used in placing it, for, in restricted quarters, it extinguishes life as well as fires, and also it is not generally available and when shipped is subject to wastage unless well protected against evaporation. Used from cylinders, carbon dioxide may so cool the manifold by which it is distributed, due to the cold resulting from expansion, that it may clog with frozen particles and seal the flow unless heat is used to prevent this occurrence, and this heat will reduce the cooling effect of the gas on the mine fire.

•

Haulage Is Most Dangerous Mine Job

In West Virginia during 1943, falls of slate and coal killed 186 men and haulage 59. Falls injured 3,090 underground and 3,552 were injured by underground haulage. About one haulage worker is employed for every ten miners, so let us multiply haulage accidents by 10 and compare the frequency of haulage accidents to the haulage mine worker with frequency of falls accidents to the face worker, and we have the astounding figures:

FATALITIES AND ACCIDENTS TO BE ANTICIPATED IN WEST VIRGINIA IF MINES HAD AS MANY HAULAGE MEN AS MINERS

Dead from falls	186
Dead from haulage	590
Maimed from falls	3,090
Maimed from haulage..	35,520

All this shows that haulage accidents are the greatest hazard which any single group of mine workers has to confront unless it be that the mine foreman faces more danger.

Rock and coal falls are due to defective roof. They can be avoided, at least in part, by care and judgment, but haulage accidents are due to defective condition and improper use of equipment and should be easier to control. It is a mechanical problem, one that the railroads have handled with excellent results, and the mines ought to be able to do the same, despite darkness and narrow roadways.

In addition, in West Virginia during 1943, 1,326 men were injured on the surface and 28 were killed. These men fell victims of mechanical hazard, depending on condition and kind of equipment and lack of care in handling it. Here, again, a multiplication factor might be used to advantage to show conclusively that surface safety closely studied will pay dividends, moral and economic. What has been said about West Virginia can be duplicated for any other coal-mining State. But don't, in stressing peculiarly mechanical risks, forget the falls hazard. It still causes about 60 percent of all mine fatalities.

•

Fighting Silicosis With Aluminum Dust

Many companies whose daily operations consist largely in mining siliceous rock for its mineral content and others whose work involves the use of siliceous materials have made careful study of silicosis and its prevention, and from it coal companies that have to drive tunnels in siliceous rock may find suggestions for the protection of their men from that disease.

Silicosis (silico-osis, silica condition) is supposed by some to be due to the scarification of the lungs by the sharp edges of the dust inhaled, but many believe that the silica becomes converted by bodily liquids to silicic acid, which causes the formation of scar tissue, so that the lungs can no longer perform their duty.

Drs. J. J. Denny, W. D. Robson and D. A. Irwin, for the McIntyre-Porcupine Mines, Ltd., and the University of Toronto, began the study of the problem in 1932 and in 1936 announced that when aluminum powder was inhaled by animals, they were protected thereby against silicosis. However, aluminum hydroxide was alleged by some to be a poison, and some fears were expressed that this compound being formed would prove harmful to human beings.

Drs. F. C. Frary and J. B. Connaughy presented to the research body the health records of 125 employees of the Aluminum Co. of America who, for some years, had been employed in the manufacture of finely powdered aluminum as constituents of paint and ink, declaring that these records appeared even better than those of 3,000 other workers in the plant not so exposed.

Dr. J. W. G. Hannon, Washington, Pa., applied the aluminum-powder treatment to men in the ceramic, silica-brick, foundry, steel and glass industries of Pennsylvania. Under it, 33 men all gained weight, increased lung capacity and were able to accomplish more work, and of 143 men claiming disability from silicosis, 135 were improved by the treatment, six were no better and two became worse.

At the McIntyre-Porcupine mines, the air in the change room is sprayed with aluminum powder and for the 10 minutes the men are dressing for the mine they are exposed to the dust, and it is expected that such a protective coating will be obtained as will prevent the onset or continuance of the silicotic condition.

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. . . the extreme flexibility, rugged construction and economy of operation has resulted in widespread acceptance of this equipment by the coal mining industry—units are in service in all of the important coal producing areas. Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa., Dept. 7-N.

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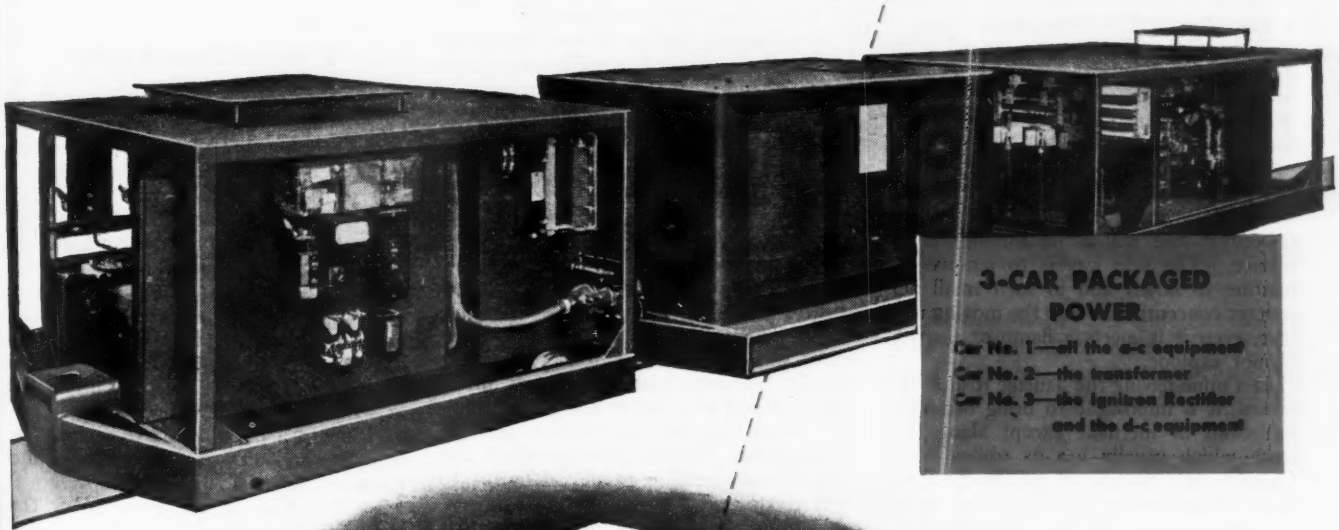

3-CAR PACKAGED POWER

Car No. 1—all the a-c equipment
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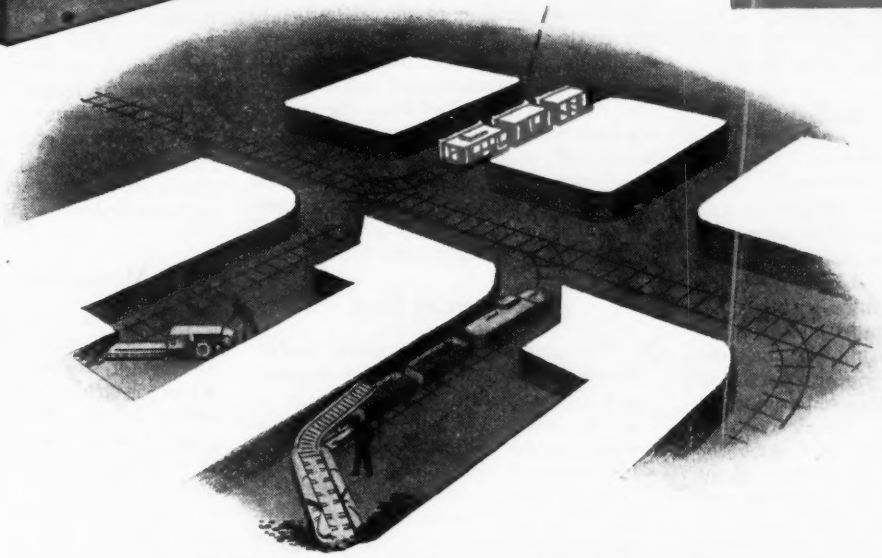
Car No. 3—the Ignitron Rectifier and the d-c equipment



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ELECTRICAL EQUIPMENT FOR THE MINING INDUSTRY

STATE-BOARD QUESTIONS

Mine Foremen, Pennsylvania

Q.—What hazards have to be faced when removing a body of methane?

A.—When a body of methane is being moved: (1) it may come in contact with sparking electrical equipment, which sparks may be created by a commutator or a broken circuit, or by a leak of electric current—for instance, a broken bond in the track, an imperfect contact between wires, a leak of electricity from trolley wire to roof or coal; or (2) it may be ignited in the return by the defective lamp of a workman; or (3) be ignited by mechanical sparks at the fan or by electrical sparks at the fan motor.

There are so many ways of igniting an explosive mixture of methane and air that it is well to assume that the gas will be ignited if and when the mixture is explosive. The safe way is to remove the mixture so slowly and in such small percentage concentration that the moving mixture, even if it meets a flame or a spark, cannot explode.

In a mine having the haulage road in the return, it is impossible to bring out accumulations of methane except along that road, which usually has its trolley wires. Consequently bodies of methane can be removed with safety only when the electric current is switched off the entire mine.

How to Move Methane

Q.—How would your proceed to remove safely a large body of methane?

A.—(1) I would cut off all electric power in the parts of the mine where the mixture is explosive, or nearly explosive, and in all parts through which the mixture will have to pass in reaching the surface.

(2) I would remove, or have someone remove, all men from the mine, except those who are to perform the job or supervise it.

(3) I would choose none but competent persons who have had experience with methane and its behavior to remove the methanous mixture, warning them about the inherent dangers of the operation, and I would equip them with carefully cleaned, properly installed and securely locked safety lamps of approved design. They certainly should not use Davy lamps—those lamps having been disapproved long ago as unsafe by the U. S. Bureau of Mines—either as a means of working in firedamp or of testing for its presence.

(4) I would arrange the doors in such a manner that the air current can be readily controlled and conducted to the gas-laden area.

(5) I would start to remove the firedamp first at the outby end, removing only a small portion of the firedamp at a time so as to keep the return air at all times below the explosive limit.

(6) I would continue this work, using doors and brattices as may be required until all the firedamp has been removed.

(7) I would arrange to have the return air travel the shortest possible route from the methane-laden area to the surface.

(8) All this I would arrange to have done under my personal supervision.

Gas Over Roof Falls

Q.—What are the legal requirements, if it is found impracticable to remove explosive gas from the inaccessible tops of a fall?

A.—The duty of the mine foreman is to make this fact known at once in writing to the superintendent, who must immediately report that fact to the State inspector, requesting him to make a personal investigation. If the superintendent and inspector are unable to devise means to remove this explosive gas within a reasonable time, the inspector must direct that a borehole, or boreholes, of not less than 6 in. diameter be drilled from the surface to a high point or high points, respectively, on such fall, thereby giving gas an opening by which to escape to the surface. Care must be taken lest, when the gas is tapped, the escaping gas may become ignited and burn, or otherwise injure, the drillers.

Disconcerting Fans

Q.—The rated capacity of a certain double-inlet centrifugal fan, 10 ft. in diameter and 5 ft. in width, is 224,000 cu.ft. of air per minute at a 3-in. water gage when the fan is running at a speed of 170 revolutions per minute.

(a) If this fan is installed in the opening of the main return airway of a large mine and operates at a speed of 170 revolutions per minute and develops a 3-in. water gage, but delivers only 150,000 cu.ft. of air per minute, why is the quantity of air 74,000 cu.ft. less than the rated capacity of the fan?

(b) If during the operation of this fan, without any electrical or mechanical change being made, the water gage suddenly drops from 3 in. to 2¼ in., what would be the probable cause? Give reason.

(c) If, without any electrical or mechanical changes being made, the water gage during normal operations and improvements over a period of time gradually decreased from 3 in. to 2.4 in. and continued at that level for a long time and then suddenly increased to 3 in., what would be the probable cause? Give reason.

Is Fan or Mine at Fault?

A.—(a) The rated capacity might be overestimated, but that is quite unlikely. Also, it is possible that the fan has been installed in a mine that will not pass 224,000 cu.ft. of air per minute with only a 3-in. water gage, but, if the fan came from a reputable manufacturer, he would have protected the operator against any such mistake, full well knowing that any failure injures the reputation of the manufacturer, no matter whose fault it is. If the fan is not newly installed, the reduced quantity of air passed may be due to falls of rock or accumulations of water in the airways, or again to a progressive extension of the haulways and airways. The difference of pressure between intake and return is $5.2 \times 3 = 15.6$ lb. per square foot. That resistance is unchanged, so the change in condition or length of the airways must explain the falling off in the passage of air. One cannot expect a growing mine to continue to be satisfied with the water gage which served it satisfactorily when the fan was installed.

More Leaks, Less Gage

(b) The decrease in resistance probably is due to a door being opened or an overcast or stopping being broken down. A cave or crevices near the outcrop may be letting in air. Much of the air is now going a shorter distance than before, and its resistance accordingly is reduced. When, however, the door is closed or the stopping or overcast is repaired, or the hole at the crop filled in, the air will have to travel the full length of the headings and to return the full length of the airways; its resistance accordingly will increase and the quantity passing will decrease.

(c) With a developing mine, the water gage usually has to be increased because of the extension of the roadways and airways, but with a mine that is reducing its produc-

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Actual photo of a Gulf Service Engineer consulting with mine Superintendent on air compressor lubrication.

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tion or is preparing for abandonment, the length of roadways and airways will decrease and the water gage necessary to pass the air required also will decrease unless the roof rock falls and the bottom heaves in the airways, decreasing the cross-section and increasing the resistance, or water collects in the passageways and the cross-section thereby is diminished. That often happens because the management, finding that the fan is more than adequate for the work it has to do and noting that costs are high and repairs to a mine about to be closed are inexpedient, does not clean out its airways. A heavy fall of rock or an incursion of water may be the cause of the sudden rise in the water gage registered at the fan. However, this will give little trouble seeing that the fan is more than able to meet the situation, unless the fall should extend.

Squat vs. Square Airway

Q.—If you have two airways under the same pressure, one 6 ft. wide, 6 ft. high and 5,000 ft. long, the other 8 ft. wide, 4½ ft. high and 5,000 ft. long, which will pass the greater quantity of air and why?

A.—The first airway has 6×6=36 sq.ft. cross-section and the second 8×4½, also equaling 36 sq.ft. of cross-section. The perimeter of the first airway is (6+6)2=24 ft., whereas that of the secondary airway is (8+4½)2=25 ft. Hence, the second airway will have more resistance than the first, as 25:24, that is, the resistance in the second area will be 1.0416 times as great as that of the first airway, or 4.16 percent more. The difference between the resistances of the two airways—squat and square—therefore is quite small.

Coal Age Quiz

Q.—How would you extinguish spontaneously ignited coal or a "gob stink."

A.—When a fire starts spontaneously such a large body of coal, rock and underclay becomes warm, even hot, that the whole area surrounding such a heat source cannot possibly dissipate it. The area to be cooled is almost as large as the area sealed. On the other hand, such an area is not so likely to leak inward at the seals and let in oxygen as when the fire has been started from external sources, because the cooling is so slow and because the pillars of the area will be able to restore its original volume by evolution of methane or carbon dioxide or both.

In such an area there usually is no water to cool the area by its evaporation, for it has long ago been evaporated, if present. It is not clear whether evaporation of water will increase the volume of the sealed atmosphere because water will dissolve carbon dioxide and so reduce the original volume to its former size and do so without any inleakage. Despite cooling, emission of methane and carbon dioxide may make the inclosure leak outward, not inward. Sometimes the goaf will not cool at all.

However, there nevertheless may be tidal movement of air inward if the barometer rise is so great as to overcome the effect of the evolution of methane and carbon dioxide, and there may be a marked tidal movement outward (1) if the barometer drops, (2) if the cooling is inconsiderable or the fire revives and (3) the two gases are evolved in quantity.

In a gob stink, despite the wide spread of the heating, there is always an area more heated than any other and, if the area sealed is large and the seals are tight, the fire may go out, but the cooling of the coal will be slow and uncertain and if the fire is to be subdued with certainty that result must be attained (1) by introducing dry ice for the cooling of the air, (2) by playing water on the fire, (3) by injection of mud into the crevices of the coal with a pump to seal it internally, called *embouage* by the French, who introduced it (*Coal Age*, Sept. 14, 1912, p. 355, and Oct. 12, 1912, p. 498), or (4) by coating the face with gunite or rock dust to cut off air.

Use of carbon dioxide generated by heat from limestone, by a chemical reaction or by combustion of coal in a furnace is definitely undesirable in this instance because such carbon dioxide will be hot or at least warm and will raise the temperature of the already overheated area. Moreover, gases from combustion always contain oxygen and, while of most assistance at the time of sealing, are really little better than the air in the area being sealed. Afterward, if completely cooled, they would help if used to restore the internal pressure of the inclosure, but more truly extinctive gases would be much more desirable. In many cases, such a fire is quarantined rather than extinguished, and it smolders for generations, occasionally impregnating the air with carbon monoxide or poisoning any men who break through the pillars or seals. As with other fires, the area should be surrounded by balanced pressure to avoid "cross-lots" ventilation.

Fortunately, this problem of fighting spontaneous fires is somewhat unusual in the United States, for the mines, not being so deep, are not so warm as those in some other countries, and possibly also, except perhaps in the Far West, are less inherently subject to spontaneous combustion. In two recent Canadian fires and in one anthracite mine, dry ice has been used. In the last instance and possibly in one Canadian case, it was done mainly for cooling; in the other instance the coal was not deep, and the purpose presumably was largely to lower the oxygen percentage.

It should be remembered that there is a critical temperature at which spontaneous heating from oxidation goes from bad to worse instead of going from worse to better by the loss of heat, and sometimes a degree or two will lower the temperature enough to turn the uncertain scale, so that when air is admitted the coal will cool and not increase in temperature. In many cases, the area must be sealed and inert gases may be introduced (1) to prevent an explosion, (2) to prevent inleakage and (3) to cool the entire area, especially the area around the fire.

When to Return

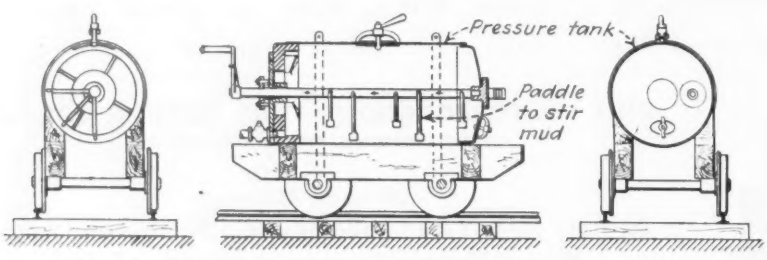
Q.—After sealing is completed, how long should return to the fire area be delayed?

A.—The length of time is not readily determinable. In a short time the fire should be of greatly reduced intensity, and accordingly the temperature of the atmosphere within the seals should be much diminished. As a result, a partial vacuum will be created in the sealed area, such as will bring a tremendous pressure to bear on the seals. Air is sure to leak through the stoppings in such a large measure that the fire will be revived, unless indeed some provision for feeding carbon dioxide or nitrogen to the fire has been provided.

Even when seals are most carefully constructed, they are not sufficiently leakproof. Extinctive gases must be added or be evolved. Methane in many cases is the gas which prevents inleakage of air and dilutes oxygen. It is present in such large quantities that it smothers the fire. The more methane, the greater the danger of an explosion, but the greater the certainty that the fire eventually will be effectually smothered, once the crisis is passed.

Unfortunately, nitrogen or dry ice rarely will be available unless it is ordered immediately when direct fire fighting starts. At no time is it more important to have inert gas to fill the vacuum, because never is the fire so hot as just before sealing, and hence at no time is the vacuum as marked as just after the fire is first sealed.

Dry ice can be put in the inclosure just before the seals are completed. Nitrogen can be fed into the inclosure through a pipe and this can be done with assurance while the fighting force has left the mine for safety. Compressed carbon dioxide, however, cannot be left so readily to feed itself into the sealed area, for it tends to freeze at the manifold unless it is heated and then its cooling action will be destroyed.



Mudding machine for extinguishing mine fire.

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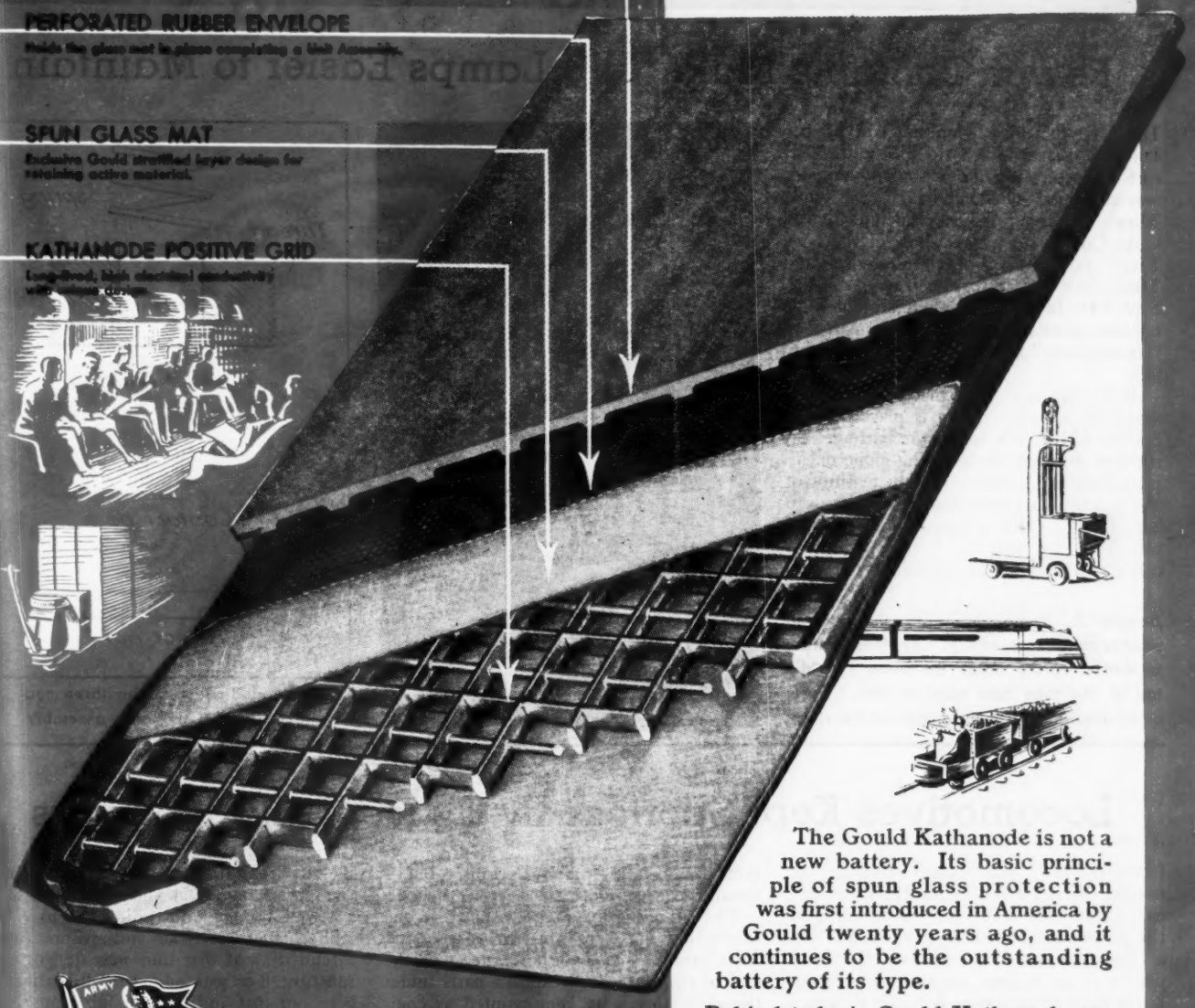

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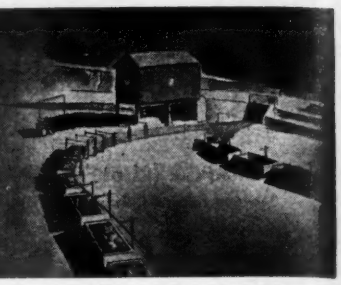
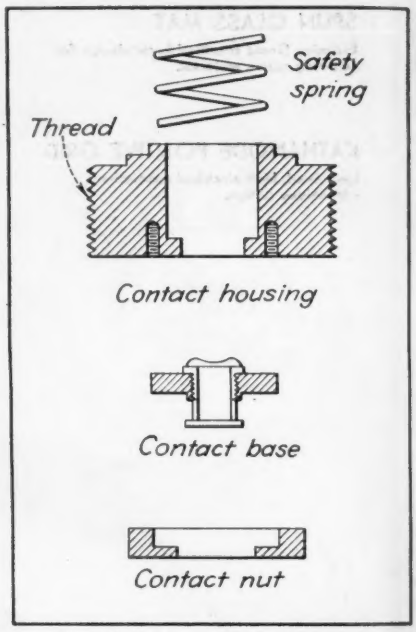


Fewer Contacts Make Trip Lamps Easier to Maintain

How to change a commercial-type trip lamp so that contact troubles caused by dirt and corrosion are materially reduced was explained by Donald A. Lowe, clerk, Mine No. 3 lamphouse, Raleigh Coal & Coke Co., at the gadget show of the New River and Winding Gulf Electrical and Mechanical Institute, Beckley, W. Va., Sept. 14. In his design there are but three contact parts at the top as compared to "six or seven," as he put it, in the factory job.

With the new three-piece shorter construction, a pump spring is placed in the bottom of the tube under the battery. Instead of a spring inside of the globe one is placed on the outside. Safety features of the trip lamp are not affected, according to Mr. Lowe. The magnetic lock is continued in use and the lamp still breaks contact if the globe is accidentally broken.

Donald A. Lowe points to the revised shorter-contact assembly. Another feature is that a spring holds the battery to the top of the tube (see tube at left). Parts of an unaltered trip lamp are at the right.



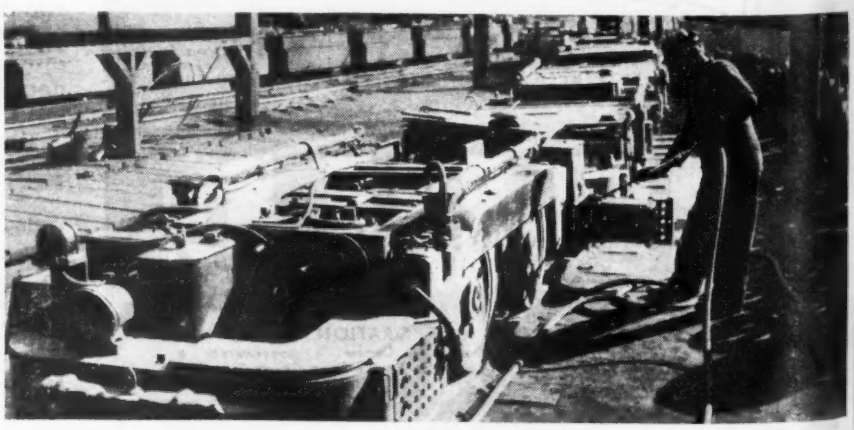
Exploded view of the three contact parts of the new assembly.

Locomotives Kept Spotless by Twice Daily Blowings

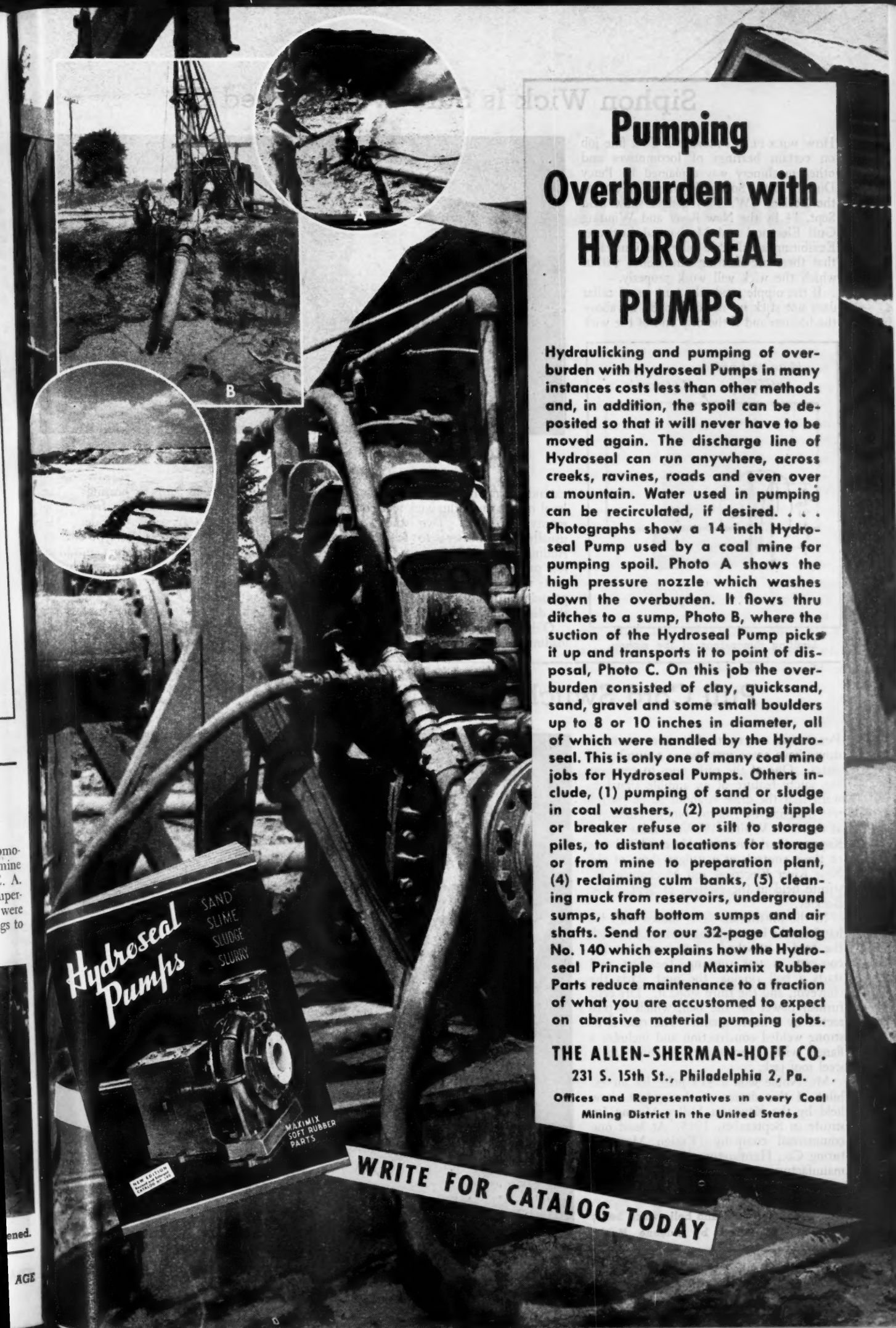
Few, if any, maintenance foremen or mining officials will question the statement that cleanliness is of first importance in the proper care of mining equipment. On a clean locomotive or machine the exact points of oil leakage are quickly spotted. Loose parts often can be detected by visual evidence of movement; protective tapes and insulations last much longer as a result of freedom from grease; parts run cooler due to absence of heat insulation and air circulation stoppages by accumulations of dirt; fire hazard is greatly reduced and thorough repairing is facilitated.

At numerous mines over the country the underground equipment is blown out with air and otherwise cleaned once a week and at a fewer number it is done once a day. Topping that is a practice followed regularly at Powellton Mine No. 3, Koppers Coal Division, Elkridge, W. Va., where locomotives are blown out twice a day; that is, at the end of each of the two shifts. This is done outside near the shop with a long air hose with a 2-ft. lance after the rubber mat has been removed and the resistance covers have been opened. It is done by a shop man and requires but 5 minutes per locomotive.

The gathering locomotives shown in the illustration are kept almost spotless and with hardly a sign of leaking grease at the end of the shift. All exposed parts under the deck covers are kept painted as completely as on the outside. These locomotives were rebuilt at the company's mine a few years ago under direction of E. A. Miller, chief electrician and assistant superintendent. At that time new designs were substituted or seals added to all bearings to keep out dirt and keep in lubricant.



Blowing out pocket after hinged cover with resistance thereon has been opened.



Pumping Overburden with HYDROSEAL PUMPS

Hydraulicking and pumping of overburden with Hydroseal Pumps in many instances costs less than other methods and, in addition, the spoil can be deposited so that it will never have to be moved again. The discharge line of Hydroseal can run anywhere, across creeks, ravines, roads and even over a mountain. Water used in pumping can be recirculated, if desired. . . . Photographs show a 14 inch Hydroseal Pump used by a coal mine for pumping spoil. Photo A shows the high pressure nozzle which washes down the overburden. It flows thru ditches to a sump, Photo B, where the suction of the Hydroseal Pump picks it up and transports it to point of disposal, Photo C. On this job the overburden consisted of clay, quicksand, sand, gravel and some small boulders up to 8 or 10 inches in diameter, all of which were handled by the Hydroseal. This is only one of many coal mine jobs for Hydroseal Pumps. Others include, (1) pumping of sand or sludge in coal washers, (2) pumping tipple or breaker refuse or silt to storage piles, to distant locations for storage or from mine to preparation plant, (4) reclaiming culm banks, (5) cleaning muck from reservoirs, underground sumps, shaft bottom sumps and air shafts. Send for our 32-page Catalog No. 140 which explains how the Hydroseal Principle and Maximix Rubber Parts reduce maintenance to a fraction of what you are accustomed to expect on abrasive material pumping jobs.

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WRITE FOR CATALOG TODAY

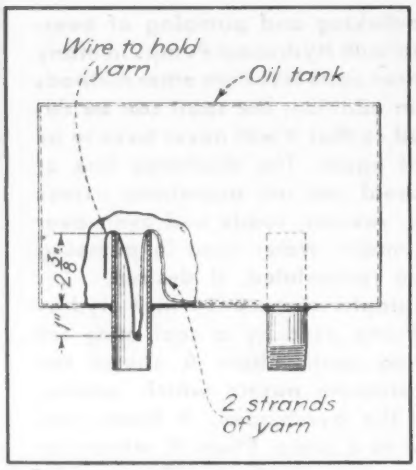
Siphon Wick Is Sure Way to Feed Oil

How WICK-FEED OILERS can do a fine job on certain bearings of locomotives and other machinery was explained by Percy Durrell, of the Socony-Vacuum Oil Co., at the Beckley (W. Va.) gadget show held Sept. 14 by the New River and Winding Gulf Electrical and Mechanical Institute. Exhibiting a full-scale oiler, he illustrated that there are limiting dimensions within which the wick will work properly.

If the nipple inside the tank or oil cellar does not stick up more than 8⅜ in. above the bottom and if the drip end of the wick extends as much as 1 in. below the bottom level of the tank, the wick will completely empty the tank. Two strands of yarn usually are sufficient to feed a bearing. Adding more strands increases the feed rate proportionately. Pure and clean lubricants must be used. Oils containing compounds will stop up the yarn, as also will the dirt in black oil.

Old hose from hydraulic systems of loading machines can be used for the connections from tank to bearings. The oiler itself can be made up from scrap pieces, using an arc or gas welder. Mr. Durrell said he first used this type oiler on Sullivan CE2 Ironclad cutting machines in Illinois in 1907. In a discussion of his exhibit several speakers confirmed the practical advantages of the oiler and it was stated that these were applied successfully to several types of mining equipment at Van Lear, Ky., six or seven years ago.

Mr. Durrell is holding the wick to illustrate its position on the inside.



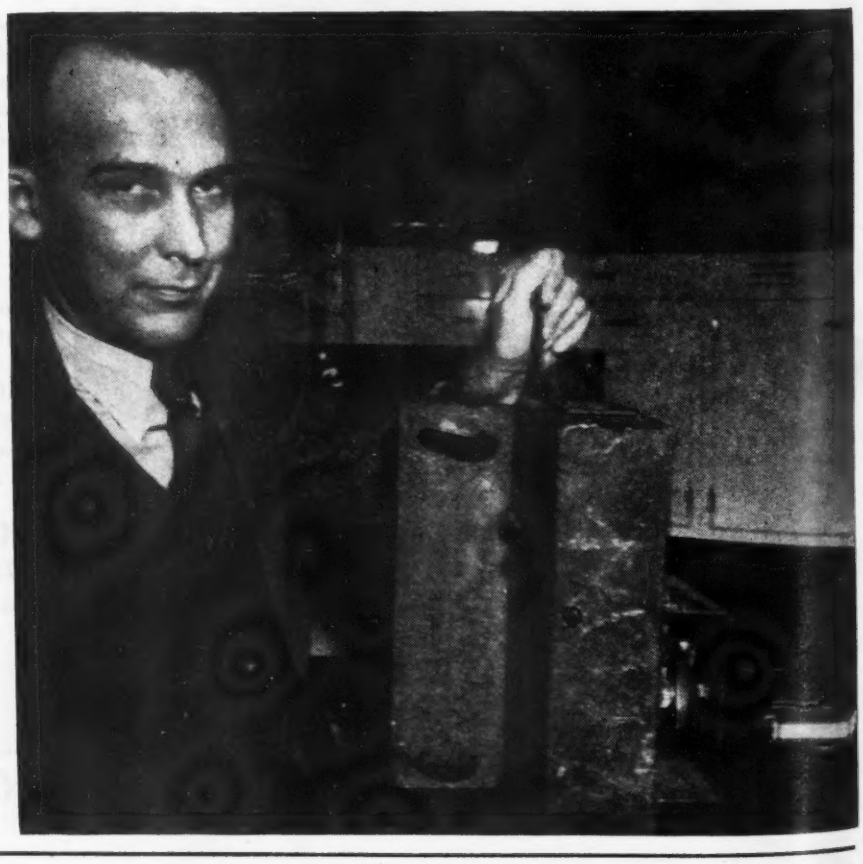
Limiting dimensions of the siphon.

Pull Cord Switch Warns of Conveyor Starting

PULL-CORD CONTROLS for room conveyor drives have come into use in a number of states. One of the early ones to combine the safety feature of an audible signal to warn that the drive is about to be started was designed by Eugene Noble, employed at the Glen White (W. Va.) mine of the Koppers Coal Division. He exhibited one of these controls at a gadget show of the New River Electrical and Mechanical Institute held in the evening of Sept. 14 at Beckley.

In the illustration he is shown with his hand on the lever (spring-return) to which the cord is attached. Assuming that the conveyor is not running, the first pull starts a bell ringing, the next starts the conveyor, and the third stops it. Dry cells furnish power for the bell, which is protected by a heavy guard. The case is of strong welded construction and includes a flange with U-bolts for attaching to a steel roof jack.

Mr. Noble won a $15 prize for an exhibit of this device at the gadget show held by the Kanawha Valley Mining Institute in September, 1943. At least one commercial company (Ensign Manufacturing Co., Huntington, W. Va.) is now manufacturing a pull-cord switch incorporating an audible signal.



Pull cord and bell switch being explained by Eugene Noble.

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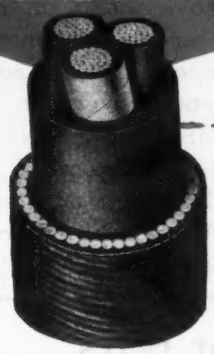

STEEL ARMORED

For supporting the weight of extra long, heavy cables and for hazardous locations where ice or falling rock would cause injury to unarmored cable.

Hazard Steel Armor and Spiralweave Cables are identical in interior construction.

Hazard Submarine Insulation, made of fully accepted Buna S synthetic rubber is standard on these cables because of its toughness, resilience, moisture-resistance, non-corrosive qualities and long life.

Each conductor is taped. The several conductors laid up round with waterproof fillers are covered with core tape and a heavy tough rubber jacket.

for *LIGHTER* DUTY

SPIRALWEAVE

For short or light weight cables such as signal or communication cable where the tough, moisture-proof type of covering is ample support.

STEEL ARMORED Cable is finished with a layer of asphalted jute, a full layer of galvanized steel armor wires and a final layer of asphalted jute with a dusting of soapstone to prevent sticking.

Steel Armor is recommended where the cables are long and heavy and the great weight requires the extra strength of the galvanized steel armor wire as the cable is hung "by the ears" from the surface. The steel also prevents possible injury from ice in the winter, or from falling rock or coal.

SPIRALWEAVE Cable is finished with a heavy "fire-hose" covering of cotton cord, woven tightly over the taped rubber sheath and slushed with weatherproof compound, finished with flake mica to prevent sticking. Spiralweave Cables are used for suspension in a shaft or borehole where a cable is comparatively short or for signal or communication cable of light weight. Exceptional strength is afforded longitudinally by the special spiral weave of the outer covering. Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

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Hydraulic Hose Stored on Shelves 6 Ft. Deep

AT MINES USING CUTTERS, loaders and other machines with hydraulic controls or actuating systems it is necessary to keep in stock numerous sizes and types of hose made up with fittings. The problem of storing these in a manner economical of room, convenient for finding and proof against kinking has been solved at the Keystone (W. Va.) supply house of the Koppers Coal Division by the shelf section shown in the accompanying illustration.

Depth of the pigeonholes is 6 ft., which is more than the longest hose carried in stock. The section, 18 in. wide by 7 ft. high, has 39 pigeonholes of which 34 are required for the present stock of hose. The section designation, "J," and the pigeonhole number for each item of hose is recorded on the respective stock card, as is the practice also with the balance of the 8,000 items kept in the Keystone supply house. General arrangement and accounting in this supply house are described beginning p. 72 of this issue.

C. R. Graley, disbursing clerk, picks out hose specified on "Order For Supplies."

Good News?

Bad news travels speedily. Good news must have a shove. New and tried tricks are performing wonders every day at your mine, and that always spells good news. Others like to read about what you are doing. Why not shove along an account of some recent mechanical, electrical, operating or safety idea that you have put to work? They are good news. Include a sketch or photograph if it will help. For each acceptable idea, Coal Age will pay $5 or more on publication.

Machine Speeds Retaping of Rotor Bars

A TAPING MACHINE used primarily for reinsulating armature coils has cut the rewinding time for motors in the Providence shop of The Hudson Coal Co., Scranton, Pa.

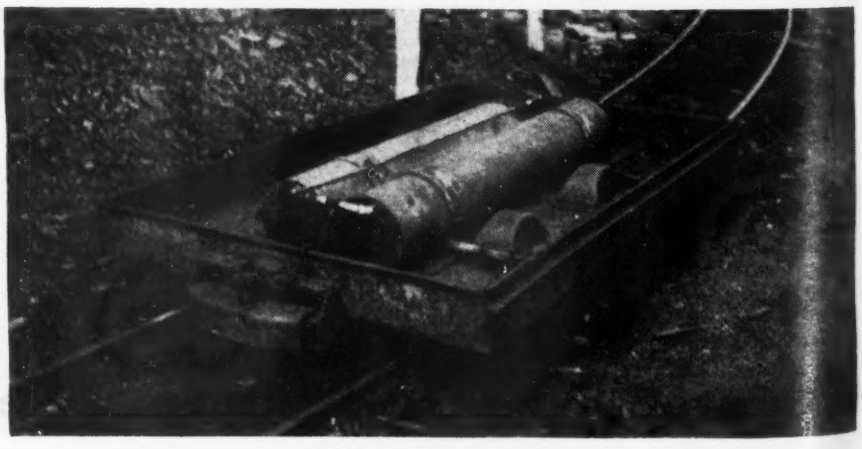
Many of the motors received for repair are rush-order jobs. When a job comes in, the rotor bars are quickly removed, stripped of their insulation, cleaned and immediately retaped in the Segur taping machine. This machine has therefore speeded up the slowest step of the rewinding job.

Rewinding a rotor bar on the taping machine

Pressure Tanks in Cars Supply Wet Drills

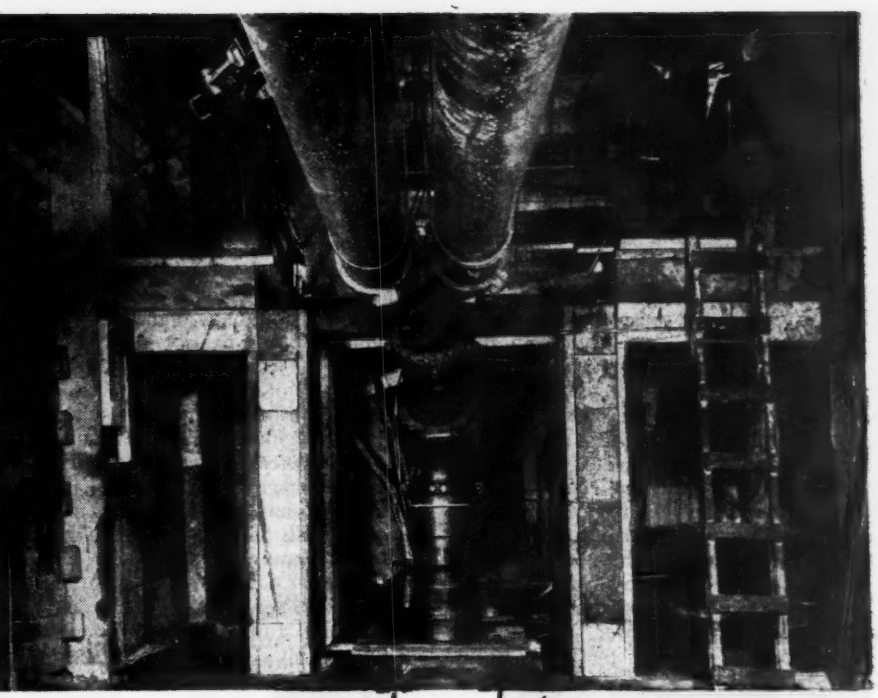
TO IMPROVE THE ATMOSPHERE in tunnel work and in entries, headings and rooms, where top or bottom is taken for gaining height or for grading, the Jewell Ridge Coal Corp., Jewell Ridge, Va., recently installed wet-type rock drills. The accompanying illustration shows one of two water cars that have been fitted for this purpose at Jewell Valley No. 2 mine.

Cylinders are 16 in. by 10 ft. and an air line is installed the length of the car with a fitting at the rear end for connecting the compressor hose and one at the front for the drill hose. Air pressure is used for forcing the water out of the tanks. In the Jewell seam rock rolls are encountered frequently and in many places they pinch out the coal and require the driving of rock tunnels.



Water car for wet drilling.

SAFEGUARD AGAINST DAMAGE FROM *Mine Flooding* BY INSTALLING BYRON JACKSON

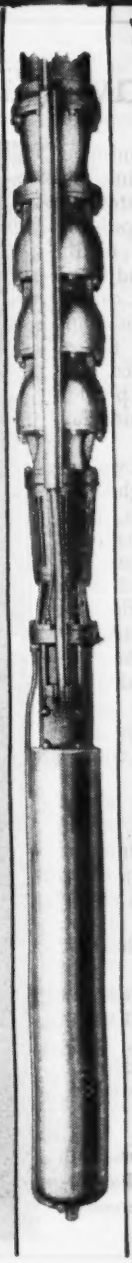


SUBMERSIBLE PUMPS

Hazards, incident to sudden flooding of mineworkings, can be greatly reduced by installing Byron Jackson Submersible motors and pumps.

This close coupled pumping unit, consisting of a motor and a pump, operates completely submerged in water. Power is supplied to the submerged motor by a marine type cable. The complete unit can be hung in the shaft, submerged in a collection sump or placed at any other advantageous pick-up point. Discharge can be at surface, at other mine levels or in abandoned workings. Lifts of up to 1,500 feet can be provided with a single pump and capacities are to 5,000 gpm. Greater lifts may be provided by combining two or more submersibles on a single discharge line.

Extra provision for sealing against sudden in-rushes of water and the costly construction of standby booster pumping stations become unnecessary. The handling of heavy, bulky pumps and drivers with their required pipe and fittings is eliminated. There are no long line shafts, cover tubes, bearings, etc., to keep in alignment and properly lubricated. All these are replaced by a simple discharge *line pipe* and an armored cable to the control switch, out of reach of possible flood waters. Write us today for further details.



Pump and motor can be set at any desired depth of from 50 to 1500 feet or more.

Pumping element is direct connected to submersible motor. Number of stages governed by required lift.

Submersible motor, completely enclosed, with armored marine cable to surface. Available in sizes from 10 to 400 H. P.

ARMY E NAVY

BYRON JACKSON CO.

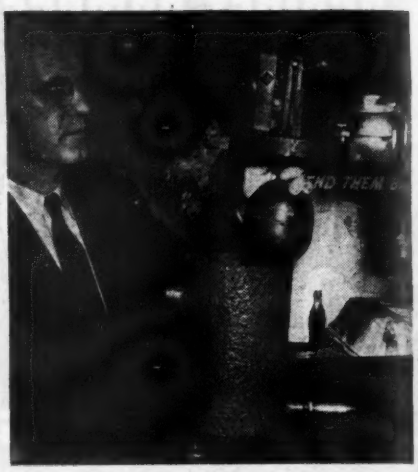
Houston • LOS ANGELES • New York

Bearings Protected by Float Switch on First Stage

THOUSANDS OF DOLLARS a year is being saved for the New River Co., Mt. Hope, W. Va., by a float switch to protect bearings of centrifugal pumps at the Summerlee, Oakwood, Lochgelly and Whipple mines. This switch was exhibited by the designer, Albert Pittman, of the New River Co., at the gadget show of the New River and Winding Gulf Electrical and Mechanical Institute at Beckley Sept. 14. The float chamber is connected by a small pipe to the top of the first stage of the pump, and when for any reason (sump low, leaky suction line, etc., or small pipe clogged) water fails to continue to run into the chamber, the float drops, operates a mercury switch and stops the pump.

The float chamber shown in the illustration is made from 6-in. pipe and the mercury switch is mounted on brackets and guides welded to the cover. From the first stage of the pump, water flows continuously into the chamber. A baffle is arranged to prevent the current therefrom interfering with the float. Water overflows continuously from the top connection of the chamber and also from a restricted opening at the bottom. When water fails, the restricted opening empties the chamber in 8 to 10 seconds and thus stops the pump. Bearing damage may occur in as little as 10 seconds without water.

These protective units are in use on twelve centrifugal pumps of four- to eight-stage and working against heads up to 600 ft. The mercury switch is hooked in with the low-voltage release. During the starting and priming of the pump the float chamber fills and closes the circuit to the release. Some of the pumps are operated on 550 volts d.c. and on those the mercury switches are serving satisfactorily, although the manufacturer gives them a maximum rating of only 275 volts.



Holding the cover and float switch above the chamber, Albert Pittman explains the construction and operation.

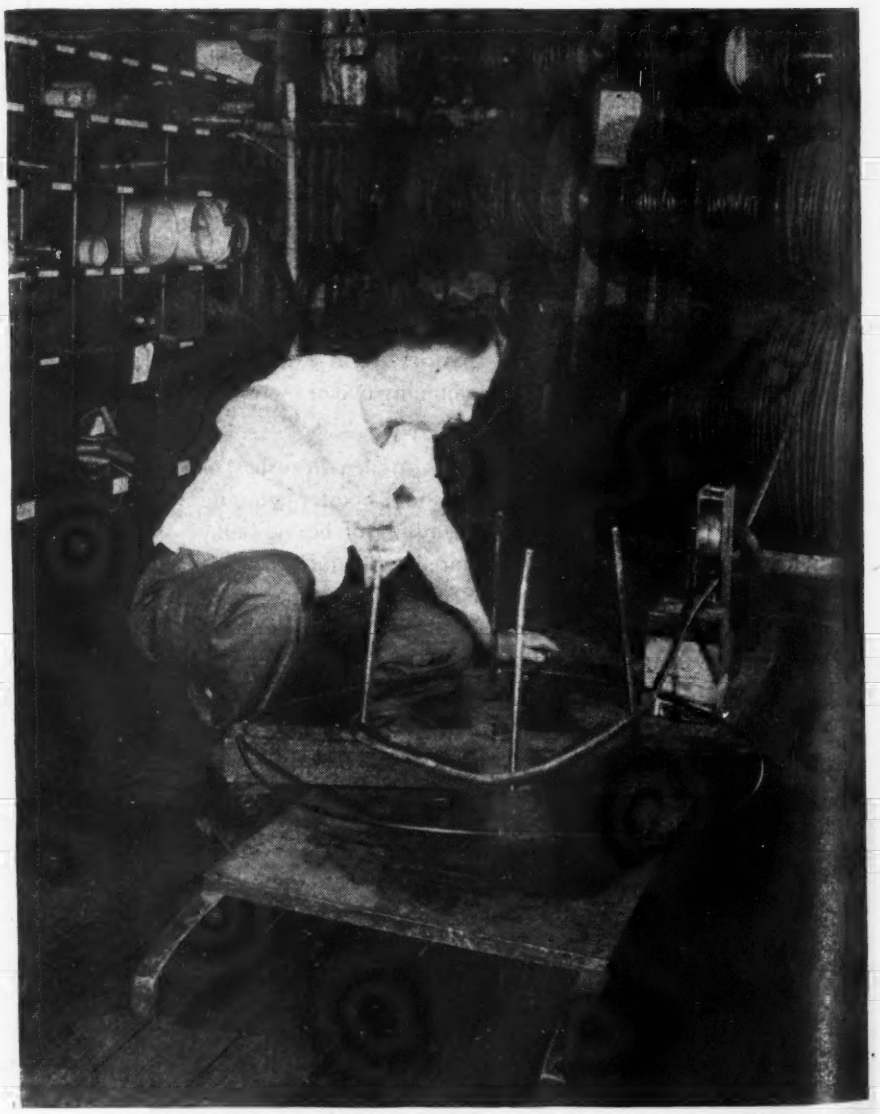
Reel Racks Save Time in Disbursing Cables and Ropes

MEASURING OUT LENGTHS of insulated wires, cables, wire ropes and chains is a supply-house job that can be wasteful of time unless special equipment is provided for storage and handling. Two of the largest supply houses, Powellton and Grant Town, W. Va., of the Koppers Coal Division, have been equipped with racks and auxiliary trucks designed to meet the requirements of storage in a small space, neatness and a saving of time and physical effort in stocking the rack, unreeling, measuring and coiling.

The illustrations, made in the Powellton supply house, show a pair of right- and left-hand racks with 12 drums each. Each group of drums is keyed to its shaft and the latter has a square shank at one end to accommodate a removable hand crank for which a hook is provided on the rack frame. Shaft drums and their loads add up to a considerable weight. Therefore brakes with hand levers are provided for bringing a unit quickly to rest after reeling or unreeling. Drums and flanges have holes into which to tie or hook the ends of wires, cables and ropes.

The auxiliary device is a truck whose platform when in use stands 6 in. above the floor and on which is mounted a porcelain guide, meter, wooden chop block and a reel. This truck has handles at the back end and two small wheels at the front. When not in use it is rolled out of the way.

This wire and cable disbursing rack was designed by A. E. Manning and built under the supervision of E. A. Miller, chief electrician and assistant superintendent at Elkridge No. 3 mine in the Powellton Division.



Having wheeled the truck to position, Earl Darlington, disbursing clerk in the Powellton supply house, reels out and measures 100 ft. of insulated cable.

RUSSIA

Threat . . . or Promise?

WHEN this war is ended, two nations—the United States and Russia—will possess the bulk of the world's military and industrial might.

Whether this new situation will hold seeds of catastrophe or of unprecedented opportunity will be determined by policies . . . still to be formulated.

If this concentration of power leads to a bitter struggle for supremacy, then the world will be turned into a giant munitions factory.

If it is used cooperatively to maintain order, then, I believe, the stage is set for a long era of prosperity . . . and peace.

It is time that Americans, whether of the Right or the Left, face this basic issue squarely and open-mindedly.

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No group in this country has a greater stake than have business and industry in seeing that a satisfactory Russian-American understanding is reached.

Without such an understanding there can be no reasonable hope for more than a temporary and insignificant reduction of our crushing wartime tax burden. If the threat of a clash between these two giants impends, neither bankers nor governments will run the risk of lending on a scale adequate to maintain international trade at levels necessary for our future prosperity. Potential international customers, instead of buying freely in open world markets, will be forced—as during the dangerous period introduced by Hitler in the early 30's—into the trading camp of whichever power they fear most.

If, however, Moscow and Washington will agree on cooperative plans for maintaining the peace, American business will enjoy enormous new trade opportunities after the war.

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Russia, during the three and one-half years since it was attacked by Hitler, has conclusively proved to a doubting world that it is a top-flight military power.

Soviet railroads did not break down under the strain of war.

Regions accounting for nearly 70 per cent of Stalin's key industries were engulfed by the invading Nazis, but before they fell, Soviet management engineers performed a near miracle by transplanting entire industries a thousand miles to the Urals with the loss of as little as four months' production in many cases.

Although American planes, trucks, and medical supplies have been welcomed by Moscow, fairness demands the admission that more than 98 per cent of American production has *not* gone to the Russian front.

Russian planning and *Russian* equipment won the victories of Leningrad, Stalingrad, and the Caucasus.

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But these measures of Soviet military strength—impressive as they are of an unsuspected economic development—fail to picture in adequate detail the startling potential of the Russian market after the war.

Russia, for instance, has two and one-half times the area of the United States.

It has a population of nearly 200,000,000, and this is increasing at the rate of 2,500,000 a year.

And statistics just released show that Russia has three times as many youngsters under 16 as has the United States. This is a measure both of war potential and of a vast commercial market.

And remember that in no part of the world before the war was per capita production rising as rapidly as in the Soviet Union.

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German armies occupied a region in Russia roughly equivalent to the territory in the United States north of Richmond, Virginia, and east of the Mississippi.

This huge area—with its counterparts of Pittsburgh, Buffalo, and Bridgeport; of Illinois corn fields, New York dairy farms, and Maine potato harvests—was *twice* subjected to the most withering destruction; first by the Russians themselves when they retreated before the Germans, and then by the Germans when they withdrew before the victorious Russians.

As a result, 30,000,000 people are in urgent need of complete reoutfitting. They need houses and shoe laces, trolley cars and baby carriages, tractors and livestock, hydroelectric plants and electric light bulbs.

Many of these needs will be met at home. It is doubtful, for instance, if Moscow will import cooking utensils or sewing machines, for many of Russia's huge war factories can quickly be converted to peacetime production of such consumer goods.

But for the rebuilding and expansion of her industries Russia looks to the United States for equipment.

Soviet representatives already are in this country with authority to negotiate for technical men and the equipment necessary to rebuild the great Donbas coal mines according to the most modern American methods.

It is important to remember that Russia's whole iron and steel industry, its non-ferrous mining and processing, some of its chemical production, much of its coke roasting and gas recovery, practically its entire automobile and tractor industry, and the largest of its hydroelectric plants, are based on American machinery and processes.

It is known among manufacturers that Russia recently has asked for bids on shipbuilding equipment, construction and roadbuilding machinery, alloy steels, textile machines, plastics, and a long list of rail, air, and water transport supplies.

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The Soviet Union, however, has more than a rehabilitation job on its drawing boards.

The first Five-Year Plan, which, as we all remember, was completed ahead of time in 1932, was devoted almost exclusively to heavy industry. Russia set out to build for itself the machines and the factories which, in later years, could turn out, at home, modern equipment for a vast range of light industries.

Stalin, when he inaugurated the second of his famous Five-Year Plans, promised that before it was completed Soviet factories would begin to turn out a flow of con-

sumer goods—ready-made dresses, canned foods, soap, cosmetics, shoes, kitchenware, automobiles, telephones, and modern houses.

But, by 1935, Moscow realized that Russia could not afford to enjoy such luxuries in the face of growing political tension in Europe. So, when the third Five-Year Plan was launched, there was no fanfare. Russians continued to wear their old clothes, to eat whatever simple food was available, and began grimly to build the industries which ultimately produced enough tanks, planes, and guns to turn the tide of battle at Stalingrad.

It is characteristic of Moscow that even before the last battles with the Nazis are over, Russia is planning to pick up its Five-Year Plans where the war had interrupted them.

Invitations to participate in a permanent exhibition in Moscow already have been mailed to American manufacturers. Soviet officials want their public to see samples of our new machine tools, aluminum and alloy products, oil-drilling machinery, bulldozers, and prefabricated kitchen equipment. Russia already is projecting specific plans to resume the job (1) of making the country an industrial giant comparable to the United States, and (2) of making life more pleasant for a long-suffering people.

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What is the measure of this postwar market in the Soviet Union?

Some estimates place the total quantity of goods which Russia might take from the United States during the first two or three years after the war as high as $5,000,000,000 a year. Then, as Russian industry is restored, imports from the United States might taper off perhaps to $2,000,000,000 a year.

Actually, these estimates are far too optimistic, unless the United States is prepared (1) to help Russia pay by buying vast quantities of Soviet raw materials, and (2) to provide large credits to handle the purchases during the first few years of rehabilitation.

The relations of American exporters with Russia during the period covered by the three Five-Year Plans have been eminently satisfactory. Moscow has met all of its obligations punctually; fifteen years of experience have reduced contract forms to the point where they cause a minimum of misunderstanding between the Russian representatives and the American producers; individual American companies with extensive prewar experience in handling Soviet business already are offering large credits on initial postwar orders though these may yet be replaced by large government credits at lower interest rates.

But the volume of trade with Russia after the war hinges upon Moscow's ability to pay. Never before the war did the United States buy more than $30,000,000 of goods a year from Russia. As late as 1938, Soviet exports to this country amounted to as little as $23,500,000, far less than enough to pay even the service charges on the credits which would have to be extended in connection with exports of several billion dollars a year. Only South Africa produces more new gold each year than the Soviet Union. But the United States does not want gold; more of it would only complicate the problem of controlling prices here.

If the United States, however, is to achieve, after the war, the high level of national income which is necessary (1) to keep our expanded factories in operation, and (2) to service the national debt, it might absorb from $90,000,000 to $100,000,000 a year of the kind of goods bought from Russia before the war—furs, timber, manganese, chromium, and handicrafts. But unless this volume of purchases from Russia can be boosted by another $50,000,000 annually, credits of the size necessary to fill immediate Russian needs could not be serviced without large supplemental importations of undesirable gold.

The nub of the situation is that Russia offers an extraordinary potential market particularly for our heavy industries which have grown so enormously during the war. But if this sales outlet is to materialize, then the United States must find a way to import from Russia (or from Russia's debtors if any) from ten to twenty times as much as we did before the war. Instead of merely going after the export business, American businessmen must explore with the Russians the possibility of buying bigger supplies of Soviet products.

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But more than the Russian market itself hinges upon sound cooperative action by the world's two leading military-industrial nations.

If trade between them is held to a minimum and if relations are strained, the flow of trade all over the world will be adversely affected.

Europe, long this country's biggest export outlet, certainly will never take the bold steps necessary to reconstitute its economy on a peacetime basis if Russia and the United States drift into a race for military supremacy.

The Balkan states, which may be industrialized by Moscow in order to reduce their dependence on Germany, and the Arab world with its huge need for transportation, irrigation, and sanitation, will not dare accept American credits or make big contracts with American engineers if Moscow frowns on the deals.

And refusal of Russia and the United States to work cooperatively to maintain the peace would kill, in their present embryonic stage, all dreams of a vast industrialization program for China.

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The opportunity to make a major change in the trade map of the world and at the same time to achieve a sharp rise in our own standard of living is before us.

It demands of American business leaders the kind of boldness and imagination that their predecessors displayed when they pioneered this country's unknown West.

It demands realistic action by men who know that the solution to this country's *real* foreign trade problem under today's conditions lies in boosting *imports* no exports alone . . . men who are not afraid of being paid for what they sell.

It calls for leaders who will approach Moscow and other major customers at once with constructive plans that would parallel in scope those on which this country is waging war . . . leaders who will make it clear at the outset that this bid for cooperative action emphatically demands that each nation shall have complete freedom to determine its internal political and economic organization without interference from the other.

It is *this* caliber of leadership upon which our future hinges.

James H. McGraw, Jr.

President McGraw-Hill Publishing Company, Inc.

THIS IS THE 29TH OF A SERIES

Our troops go ashore from a landing barge to engage the enemy.
ACME PHOTO

Wire Rope goes wherever our land, sea and air forces go. To carry the fight to the enemy, their supply of rope must constantly be renewed and expanded. You tell them, "Here ... use some of mine," every time you get along with fewer new ropes. The suggestions below, *if followed,* will help you conserve wire rope ... and time ... and manpower ... by making each rope installation deliver maximum service:

1. Use preformed rope wherever possible. It handles more easily ... requires a shorter breaking-in period ... resists kinking and bending fatigue ... protects men and equipment from broken outer wires.

2. Instruct operators in correct practices. Wire rope life is in their hands. By avoiding overloads, jerking, too fast acceleration and excessive speeds ... by watching drums and sheaves for conditions that cause rubbing, nicking or pinching ... the operator may double the service of a rope.

3. Lubricate wire rope faithfully. Think of those endless grooves between wires and strands as oil holes through which the moving wires and hidden core must get sufficient lubrication to minimize friction and wear. Rust and corrosion attack rope parts whether working or waiting, unless you provide a protective coating.

And team up ropes that give uniform service. *Preformed* Yellow Strand Wire Ropes work smoothly together because they are engineered to the same standards of efficiency and durability. Used on hoists, inclines, mining machines, car dumpers, tramways, draglines, shovels, they take a lot of the headache out of wartime mine operations. Our Hand Book, "Wire Rope for Mining," contains many practical pointers. Send for a copy ... today.

Broderick & Bascom Rope Co., St. Louis

Branches: New York, Chicago, Houston, Portland, Seattle
Factories: St. Louis, Seattle, Peoria

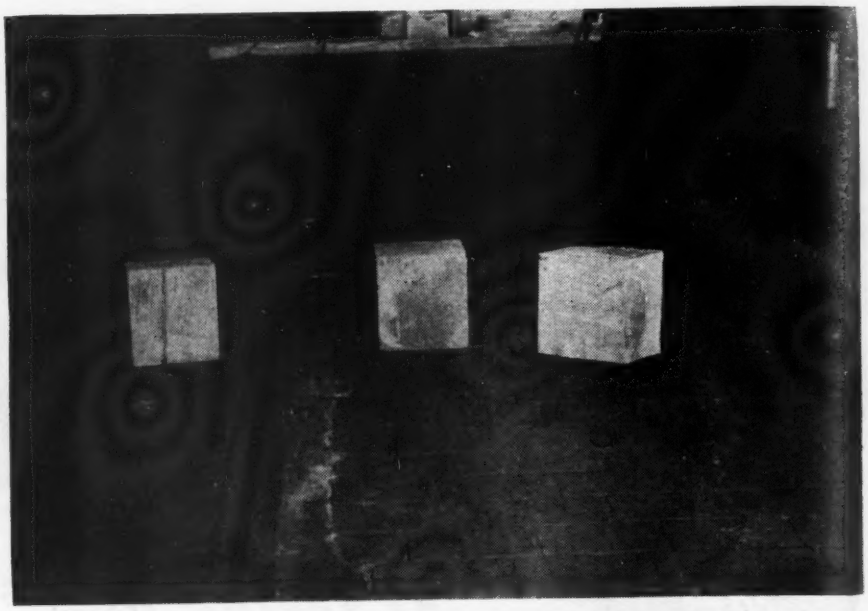
YELLOW STRAND
PREFORMED WIRE ROPE

Wooden Car Sill Ends Make Shop Floor

WASTE ENDS SAWED from 6x8-in. car sills are being used to refloor the various buildings of the Providence shop of The Hudson Coal Co., Scranton, Pa.

Scrap pieces of sawed white oak, shown in the accompanying illustration, are squared up to 6x8-in. blocks 6 in. long. A 5-in. concrete base (lean mixture) with a 1½-in. layer of sand on top serves as a foundation for the wooden blocks. All blocks are laid on end and joints are staggered.

The finished floor has a good appearance, is easily kept clean and makes an ideal floor for workers who must be on their feet all day. Machine tools and machined parts inadvertently dropped on this type of floor do not suffer the way they do when dropped on a concrete floor.



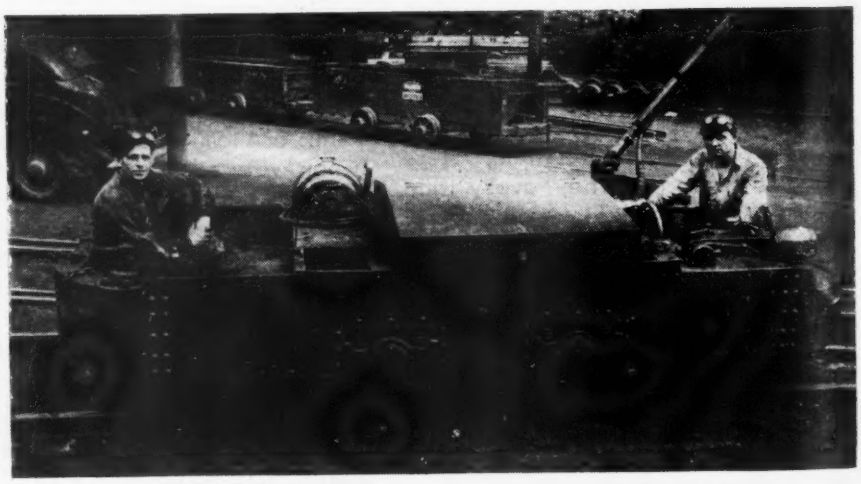
How the scrap ends appear before they are squared up and the type of floor they make are shown in this illustration.

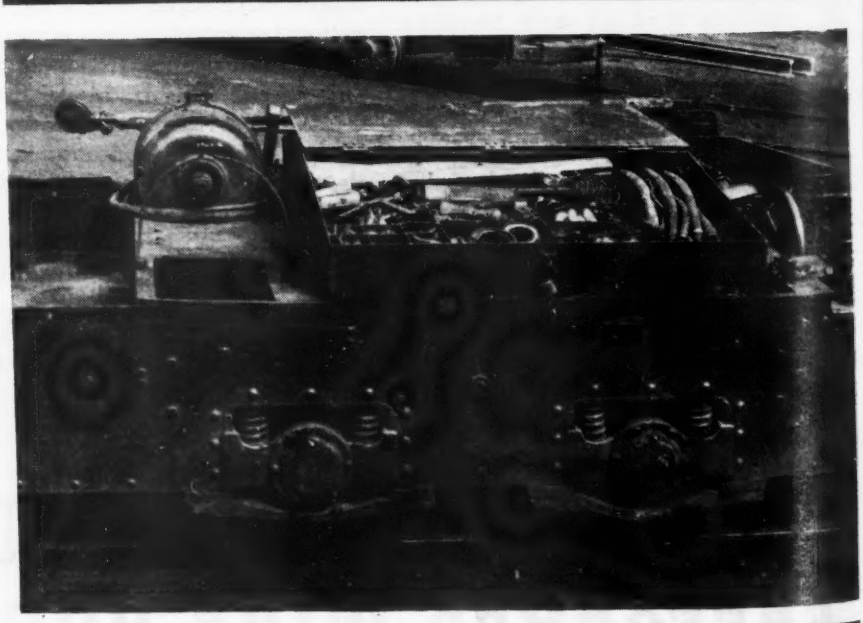
Repairmen's Jeep Carries Extra Motors

SPECIALLY CONSTRUCTED CARS and trucks supply the answer to many of the new problems of maintenance and delivery of spare parts resulting from the introduction of mechanical mining. The accompanying illustrations show the "repairmen's jeep" used at the Keystone (W. Va.) mine of the Koppers Coal Division to service mobile loaders and cutters in the eight mechanical sections, which are operated two shifts. The jeep is brought out between shifts and its stock of spare parts replenished.

This car was built from the frame of a discarded battery locomotive. Traction is by one street-car motor which was applied without winding changes because the Keystone mine is operated on 550 volts d.c. Spare parts regularly carried on the jeep include two extra motors for the mobile loaders—a traction motor and head motor. At the time the illustration was made, however, one motor was temporarily missing from its clamps.

One end of the car is equipped with a vise. The center is taken up by two compartments with locking doors hinged along the center. One compartment is for tools and the other for small spare parts. The latter are segregated by partitions forming 24 bins of various sizes. From the stock on the jeep the crews replenish the small stocks of supplies kept on boards in the sections.





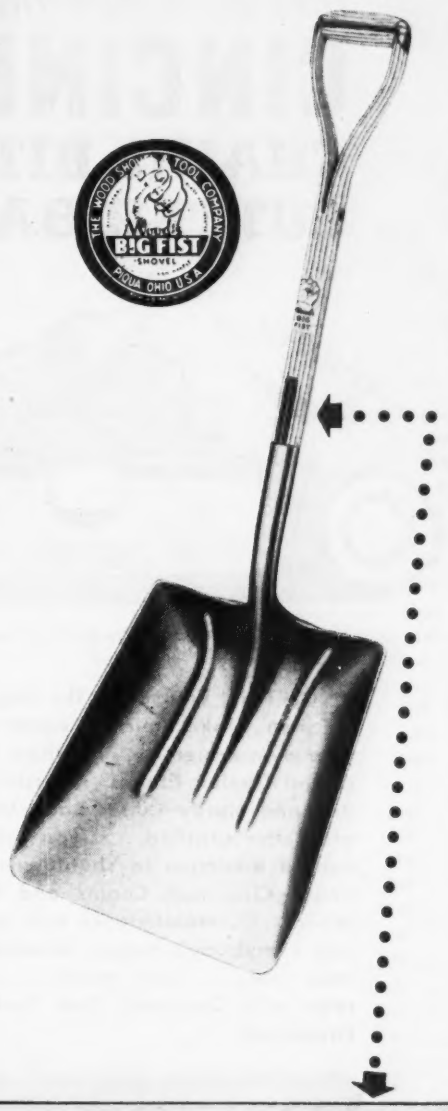
Top right: Repairman Perry Lee and Russel East have replenished the stock of parts in the self-propelling supply and repair jeep and are about to go into the mine at the beginning of the second shift. Bottom right: Here the cover of one compartment has been opened to show partitions and the stock of spare parts and supplies.

WOOD *Specialization* assures BETTER WORK FROM THE WORKMEN!

BIG FIST BRAND COAL SHOVELS are designed to meet the requirements established by experienced mining men. They are easier on the men—with them, men can do more work, in less time, with less effort and fatigue. They are designed and made for better performance on the job—a result of WOOD'S 40 years of specialization in producing only the finest shovels which can be found, anywhere, at any price.

BIG FIST BRAND COAL SHOVELS have blades made of special analysis Alloy Steel, precision tempered, Brinell tested. Handles are of specially selected, thoroughly seasoned XX Grade Northern White Ash. Made to do better work and last longer on the job, they are favorites with men who use them, preferred by buyers who want shovel costs reduced.

BIG FIST Corrugated Coal Shovel with Steel I-Beam Handle Reinforcement.



A National Organization Specializing Exclusively in Shovels, Spades and Scoops.

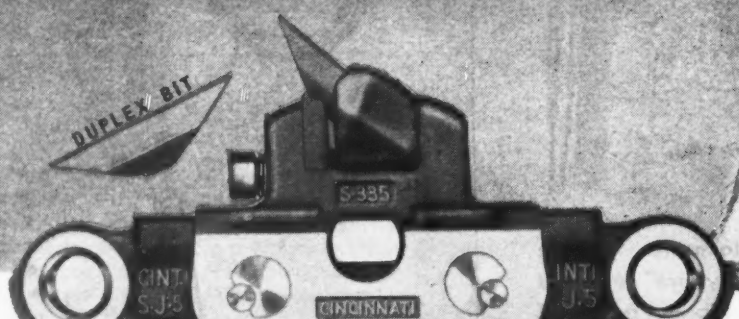
WOOD's Exclusive Steel I-Beam Handle Reinforcement

Adds 30% and More STRENGTH Where 65% of Breaks Occur.

Don't Get Yourself in the Dog House!

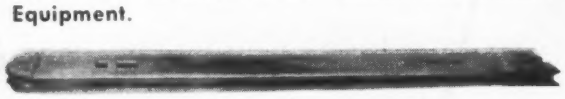
GIVE YOUR MEN TROUBLE FREE

CINCINNATI CHAINS, BITS AND CUTTER BARS...



CINCINNATI DUPLEX CHAIN

DON'T get yourself in the dog house with your men. Make their job easier and you'll make your own easier . . . give them trouble free, Cincinnati Duplex Chains, reversible, double ended Bits and sturdy Cutter Bars. Machine operators are better satisfied . . . you get greater production, a minimum in shutdowns and larger cuttings. Cincinnati Chains and Bits are easy to service . . . maintenance time is cut to the bone and everybody's happy, including the boss. Save man hours . . . save power . . . decrease cutting costs with Cincinnati Time Tested Coal Cutting Equipment.



CINCINNATI CUTTER BAR

Engineered and constructed for heavy duty . . . for long life . . . to withstand bending stresses. Constructed to fit all popular mining machines . . . both regular and thin kerf.

CINCINNATI STANDARD CHAIN

Cincinnati Standard Chain accomodates Stanex Holder and Bit or regular ½" x 1" bit. Similar in design to the famous Duplex Chain.

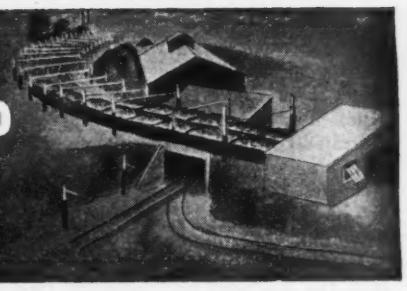
STANEX HOLDER AND BIT

The Stanex Holder and factory made double ended Stanex Bit fits all chains that accomodate the regular ½" x 1" bit.

THE CINCINNATI MINE MACHINERY CO.

2983 SPRING GROVE AVENUE • CINCINNATI, OHIO

COAL AGE NEWS ROUND-UP



Travel Pay Upheld In Jewell Ridge Case

Travel time is work time under the Fair Labor Standards Act, the Fourth U. S. Circuit Court of Appeals ruled Oct. 6 at Asheville, N. C., in a decision in the Jewell Ridge portal-to-portal case, reversing the opinion of Judge A. D. Barksdale in the District Court at Roanoke. The appellate court's opinion, rendered by Judge John J. Parker, was concurred in by Judge Armistead M. Dobie, while Judge Morris A. Soper dissented. The majority decision of the appellate court relied in large degree on the U. S. Supreme Court ruling in the Alabama ore mines portal-to-portal travel-time case rendered last March.

The District Court decision upholding the contention of the Jewell Ridge Coal Corp., Tazewell, Va., that the wage and hour law does not require inclusion of portal-to-portal travel time in computing the work week was handed down Jan. 25. The case was argued on appeal by Local 61-67, United Mine Workers of America, June 28.

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Long-Range Campaign Projected by B.C.I.

An extensive and longe-range advertising campaign is being launched by the Bituminous Coal Institute in both general and trade magazines in an effort to give the consumer public, those in building and allied trades, and producers and dealers more information about bituminous coal, according to Harry M. Vawter, institute director. Backbone of the campaign will be a series of full-page advertisements—some in color and some in black and white—to appear in the *Saturday Evening Post*, *Liberty*, *Newsweek*, *U. S. News*, *Nation's Business*, *Atlantic Monthly* and *Harper's Magazine*. These advertisements will point out in detail how intimately coal touches the lives of every American and how modern civilization is directly dependent upon the nation's supply of coal.

Second phase of the campaign will be a series of insertions in architectural and building magazines including *Better Homes and Gardens*, *American Home*, *American Builder* and *Architectural Forum*. Based on the fact that coal is the most economical, most efficient and most dependable type of heat, these advertisements will stress the importance of building new homes—regardless of what fuel is planned at the time—with a chimney sufficiently large to accommodate *all* fuels, including bituminous coal, if, as and when supplies of other fuels are exhausted or become too expensive.

In this connection the Bituminous Coal Institute is sponsoring a competition among architects for the best basement floor plan of a small post-war home incorporating a heating plan permitting the use of any type of fuel. First prize is a $1,500 War Bond; second, a $1,000 bond; third, a $750 bond; and there will be 15 awards of $100 each, or total of $4,750 in War Bonds.

Finally, a series of institute advertisements are scheduled to appear in about twelve coal-trade journals, urging producers and dealers to tie in locally with the "adequate chimney" campaign. These trade advertisements will include the offer of consumer literature upon request to the institute. Benton & Bowles, Inc. handles the account.

COAL ACTIVITY

Bituminous Coal Stocks

	Thousands Net Tons Sept. 1, 1944	P.c. Change From Aug. 1, 1944	P.c. Change From Sept. 1, 1943
Electric power utilities	17,401	+2.6	−7.8
Byproduct coke ovens	5,928	+3.8	−12.1
Steel and rolling mills	775	−4.4	−17.5
Railroads (Class I)	14,633	+6.1	+9.2
Other industrials	19,392	+6.2	−31.9
Total	58,129	+4.7	−15.1

Bituminous Coal Consumption

	Thousands Net Tons Aug. 1944	P.c. Change From July 1944	P.c. Change From Aug. 1943
Electric power utilities	7,044	+9.8	+1.7
Byproduct coke ovens	7,978	+0.1	+2.7
Steel and rolling mills	831	+6.5	−3.1
Railroads (Class I)	10,441	+1.9	+0.6
Other industrials	10,661	+8.3	−9.4
Total	36,955	+4.8	−1.9

Bituminous Production

September, 1944, net tons	50,010,000
P.c. change from September, 1943	−3.5
January-September, 1944, net tons	472,445,000
P.c. change from Jan.-Sept., 1943	+7.1

Anthracite Production

September, 1944, net tons	5,443,000
P.c. change from September, 1943	−0.6
January-September, 1944, net tons	49,184,000
P.c. change from Jan.-Sept., 1943	+6.6

Sales, Domestic Stokers Vs. Oil Burners

	Stokers	Burners
August, 1944	4,310	2,392
P.c. change from Aug., 1943	+59.9	+162.8
January-August, 1944	19,905	18,793
P.c. change from Jan.-Aug., 1943	+18.2	+55.6

Index of Business Activity*

Week ended Oct. 21	230.7
Month earlier	230.9
Year earlier	240.6

**Business Week*, Oct. 28.

Electric Power Output†

Week ended Oct. 21	4,345,352,000
P.c. change from month earlier	−0.7
P.c. change from year earlier	−1.6

†Edison Electric Institute.

•

To Make 150,000 Tons Packaged Fuel a Year

A plant to manufacture packaged fuel, to be known as "white glove" fuel, to be made from 80 percent anthracite and 20 percent bituminous fines held together by an asphalt binder, is to be built in Philadelphia by the Blaw-Knox Co. of Pittsburgh. The new fuel, which is not to be confused with briquets, will be processed in the form of 3-in. cubes, a package of six weighing 7½ lb.

Sponsored by the War Production Board and indorsed by the Solid Fuels Administration, the plant, including land, building and equipment, will cost $400,000. It will be financed by the Defense Plant Corp. and its erection is expected to take four to five months after construction is started. The plant is to have an annual capacity of 150,000 tons, using about 120,000 tons of anthracite and 30,000 tons comprising bituminous fines and asphalt binder, and will be operated for the time being by Blaw-Knox.

•

Establish Office Of Synthetic Liquid Fuels

An Office of Synthetic Liquid Fuels has been established in the Fuels and Explosives Branch of the U. S. Bureau of Mines, with Dr. W. C. Schroeder appointed acting chief. Set up to guide the five-year program of research and development recently authorized by Congress to provide oil and gasoline from sources other than natural petroleum, the program includes the construction and operation of laboratories and demonstration plants to acquire the "know how" for private commercial production of synthetic liquid fuels from coal, lignite, oil shales and agricultural and forestry products.

The work of the new office will be divided among four divisions: a Research and Development Division, headed by Dr. Henry H. Storch, with Dr. Lester L. Hirst as assistant chief; a Synthesis Gas Production Division, headed by W. W. Odell; a Hydrogenation Demonstration Plant Division, and a Gas Synthesis

Demonstration Plant Division. An Oil Shale Section, set up within the Bureau's Petroleum and Natural Gas Division, has as its chief Albert J. Kraemer, with H. P. Rue, now supervising engineer of the Bureau's Petroleum Experiment Station at Laramie, Wyo., in charge of the new oil shale research and development laboratory to be established at the University of Wyoming, Laramie.

With an initial appropriation of $5,000,000, the synthetic fuels program calls for three demonstration plants, one for the extraction of oil from shale, another using the direct hydrogenation process of converting coal, lignite, agricultural and other products to liquid fuels, and a third utilizing the gas synthesis process for the same purpose.

Plant Plans Ready

Plans for construction of a synthetic liquid fuels research and development laboratory by the U. S. Bureau of Mines at Bruceton, Pa., near Pittsburgh, were announced Oct. 25 by Secretary of the Interior Harold L. Ickes following a conference in Washington, D. C., at which the Bureau's long-range study of producing gasoline and other essential fuels from coal and oil shale was discussed. Secretary Ickes said that the various structures comprising the large laboratory—the most modern of its type in the world—should be ready for occupancy by the fall of 1945. The various units in the laboratory and other facilities will occupy about seven acres and will include three large buildings each three stories high, a power house and several smaller service buildings.

In announcing the latest development in the Bureau of Mines research program, Secretary Ickes emphasized that the laboratory, to be known officially as the Research and Development Laboratory for Synthetic Liquid Fuels, should not be confused with demonstration pilot plants that the Bureau will build later to demonstrate two methods for producing gasoline and other valuable products from coal. The laboratory will work out the kinks in the various processes to be studied, he explained. It will serve two purposes: to reduce the cost of constructing the larger-size demonstration plants, and to improve the methods of producing liquid fuels from coal so that the demonstration plants will be the most modern that can be built and operated.

Dr. R. R. Sayers, Bureau of Mines Director, and others who mapped the synthetic liquid fuels research program reported that the extensive laboratory facilities at Bruceton will be used to develop improved techniques over those now employed in England and Germany. "Our demonstration plants, which will be built later, are to embody the new and improved methods worked out in the Bruceton laboratory," said Dr. Sayers. Improvements in the demonstration plants to give industry the 'know how' on synthetic liquid fuel techniques will be based on tested ideas, methods, equipment—which come from the laboratory."

Conferees said that when the demonstration plants are built "they must be the most up to date we can devise; if they are built in 1945 they must be 1945 plants, not 1935 plants."

Heading the Research and Development Laboratory for Synthetic Liquid Fuels at Bruceton will be Dr. H. H. Storch, recently named chief of the Research and Development Division of the Office of Synthetic Liquid Fuels. Dr. Storch, who went to England last year to study synthetic liquid fuel processes, now is stationed at the Central Experiment Station, Pittsburgh. Dr. Storch said that the laboratory will employ about 280 persons when completed and that approximately half will be technical persons. The nucleus of the Bruceton staff now is undergoing training at Pittsburgh, where the Bureau has been working on various phases of the research program since 1936.

•

Over-Fire Jets Abate Train Smoke

Tests of steam jets on switch locomotives of three southern railroads at Nashville, Tenn., proved so successful in eliminating smoke that other lines are making similar experiments. Sponsored by the Nashville Smoke Commission, the tests consisted of firing the three engines, which produced huge clouds of black smoke, then putting the jets into play. When this was done, the smoke, it is said, diminished to such an extent as to be practically unnoticed.

The new device is simple and can be constructed of material readily available in any maintenance shop, according to I. C. Thomasson, chairman of the Nashville Smoke Commission, who said that "over-fire jets can correct many deficiencies, though they are not a cure-all for smoke caused by extremely poor firing practices or equipment." E. D. Benton, fuel engineer, Louisville & Nashville R.R., conducted much of the research leading to perfection of the steam jet.

•

Allows Any Grade Oil For Coal Spraying

Deputy Petroleum Administrator Ralph K. Davies announced Oct. 24 that Petroleum Distribution Order 13 has been amended to permit the use of any grade of fuel oil for coal-spraying purposes. Previously only Nos. 5 and 6 and Bunker C fuel oil, asphalt and asphaltic products could be used for this purpose. Mr. Davies explained that this action was recommended by the Solid Fuels Administration because many coal producers are not equipped to spray coal with heavy-grade fuel oils.

"Coal is sprayed with oil to prevent windage loss and to prevent the coal from freezing into large masses that are difficult to handle," Mr. Davies said. "Only a small quantity of fuel oil is required annually for coal-spraying purposes, and our supply situation is sufficiently improved so that we can make it available for this important purpose. Granting the use of light grades of fuel oil will permit necessary spraying and will facilitate the handling of coal at terminals and speed up the transportation of coal."

"It's land mines we're looking for; not coal mines."

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British Group Studies American Stripping

A commission appointed by the British Ministry of Works completed a trip through the Pennsylvania anthracite area early in October to study stripping methods. It was under the guidance of J. Robert Bazley, Pottsville stripping contractor who had just returned from his second trip to England, where he advised the British coal industry concerning American methods of stripping.

The visiting commission included Col. A. L. Mieville, U. S. Representative of the British Ministry of Supplies; Arthur Monk contractor, Lancashire; J. R. Casely, Deputy Director of Operations, Open-Cast Coal Production; Arthur Lord, technical adviser, Civil Engineering Contractors Federation; Sir Malcolm McAlpin, Sir Robert McAlpin & Sons, civil engineering contractors, and chairman of 85 contractors engaged in stripping operations in Britain; Lewis Jacobs, labor representative, and H. Richardson, Assistant Director of the British Ministry of Works.

The visiting delegation arrived in Evansville, Ind., Oct. 11 preparatory to observing open-cut methods in Pike and Warrick counties, Indiana. Guided by Kenneth Young, formerly connected with the Winslow Coal Corp., Petersburg, the visitors said: "We are lost in admiration at the magnificent equipment and the grand scale of strip-mining operations in southern Indiana." On Oct. 14 the party left for northern Illinois.

•

New Binder Utilizes Hard-Coal Fines

Commercial utilization of about 10,000,000 tons annually of anthracite screenings and similar carbon fines is promised by a new binding process now under test by the U. S. Bureau of Mines and the National Inventors' Council, according to a recent announcement. The new process, covered by U. S. Patent No. 2,136,591, combines anthracite dust and screenings with about 20 percent of bituminous fines in a large hopper. The mass is wet down with a low-temperature tar, churned and fed through compacting rollers, much as in a paper mill. The resulting carbon ribbon then passes through a continuous low-temperature coking oven at controlled speed. About 20 minutes of controlled-temperature coking is said to cement the coals together with a firm combustible binder. The completed solid fuel is discharged continuously in random sizes, which may be graded if desired.

Samples made from ordinary yard screenings, it is said, have shown the density and burning qualities of the best grades of anthracite. It also is asserted that the process allows a wide range of formula to meet varying fuel specifications from forced draft to still burning smokeless. In terms of heat, the binder plant is said to be largely self-sustaining, as the gas and tar recovered from the slow coking chambers may be returned to the process.

The patent is held by Roy G. MacPherson, 81 Warren Road, Framingham, Mass., a graduate of Massachusetts Institute of Technology and a consulting engineer of Boston and New York. Soon after Pearl Harbor, MacPherson volunteered for service in the U. S. Coast Guard and was commissioned as an administrative officer for the Port of Boston. He then put aside his development plans for the duration. But the recent call of Solid Fuels Administrator Harold L. Ickes for better utilization of anthracite fines prompted him to lay his patent process before the National Inventors' Council, whence it went to the Burea of Mines.

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Personal Notes

RALPH H. KNODE, president, Stonega Coke & Coal Co., with offices in Philadelphia and operations in Virginia, was unanimously elected treasurer of the National Coal Association by the board of directors Oct. 26, succeeding William D. Ord, deceased. Mr. Knode has been a member of National's board of directors since 1930 and actively identified with its affairs, serving on various regular and special committees.

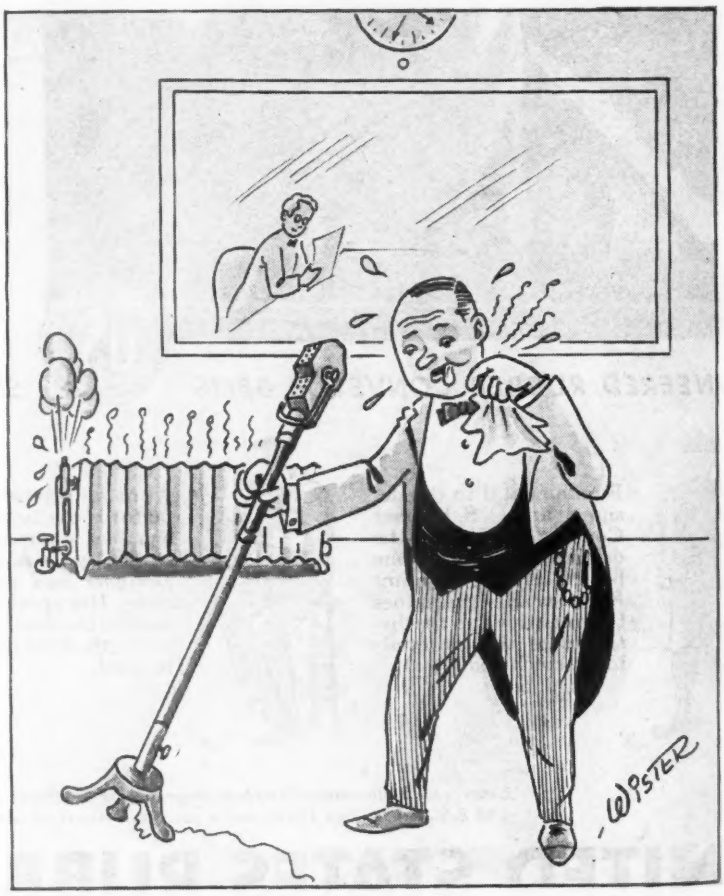
T. H. WILSON has been named general manager of the Crows Nest Pass Coal Co., Michel, B. C. T. G. EWART has been appointed secretary and assistant to the president. W. C. WHITTAKER is the new general superintendent, vice BARNEY CAULFIELD, voluntarily retired after 30 years in the industry. Mr. Whittaker has been with the company a number of years.

PATRICK O'HARA, superintendent of the Delaware and Laflin collieries, Hudson Coal Co., Hudson, Pa., has been promoted to superintendent of tenements and subsidence for the Luzerne-Lackawanna area.

ELMER WILLIAMS, general mine foreman at Delaware colliery of the Hudson Coal Co., Hudson, Pa., has been advanced to superintendent of the Delaware and Laflin collieries, vice Patrick O'Hara, promoted.

GEORGE B. PRYDE, vice president—operation, Union Pacific Coal Co., which he first joined in 1893, has retired, effective Nov. 1. After a course in the University of Wyoming he returned to the company in 1902, became foreman of No. 8 mine in 1904; was made assistant superintendent in 1911; elevated to mine superintendent the same year; appointed assistant general superintendent in 1912 and became general superintendent one year later. In 1920 he was appointed acting general manager; in 1924 vice president and general manager; and in 1938 vice president—operation.

I. N. BAYLESS, general manager of the Union Pacific Coal Co., with which he has been connected since 1929, has been promoted to president and general manager, succeeding Eugene McAuliffe, who has been made chairman of the board of



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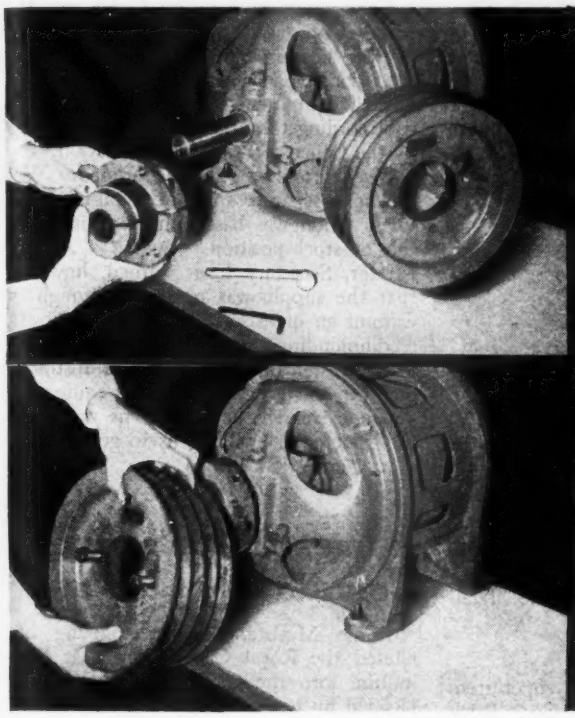

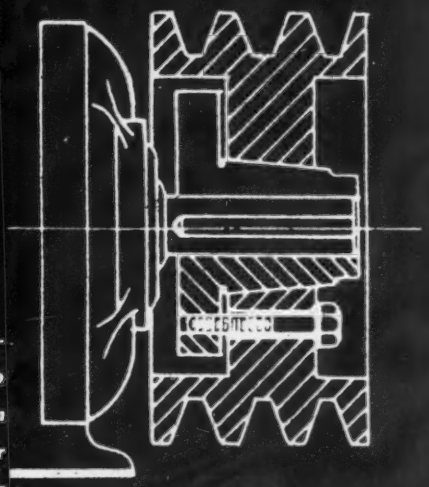

Split hub makes installation easy. Hub stays put—only rim is changed. Bigger pull-up bolts—higher taper cone pressure.

Worthington's QD Sheave is easy to get on, easy to get off, yet always tight on the shaft

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trustees. Starting as assistant general manager, he became general manager in 1938. In his new position he also will serve as a member of the board of trustees. He entered the mines at the age of 18, studied business administration and took two courses in mining. Returning to the mines, he advanced from boss driver to mine foreman and thence to mine superintendent and general superintendent at the Kathleen mine of the Union Colliery Co., Dowell, Ill. He also worked in West Virginia, Kentucky and other southern Illinois mines before moving to Utah as general superintendent, Utah Fuel Co.

JOSEPH HUTCHINSON, formerly assistant foreman at Somers mine of the Pittsburgh Coal Co., has been made assistant mining engineer in the engineering department.

STANLEY RADZIWON, formerly standards engineer with the Pittsburgh Coal Co., has been made mine foreman at Solar mine, McDonald, Pa.

ROBERT RONK has been appointed general superintendent of the three mines of the Midland Electric Coal Co., operating in northern Illinois. JAMES MCDOWELL succeeds him as Rapatee mine superintendent and MAX WASSON takes over as pit boss.

E. MAXWELL CASSIDY, who was given a battlefield promotion from captain to major in the combat engineers in Normandy, as noted in our September issue, was given a citation and awarded the Bronze Star. He has since been reported missing in action in Germany.

EUGENE MCAULIFFE, president of the Union Pacific Coal Co. since 1923, has been made chairman of the board of trustees. During the first World War he served as director of the fuel conservation section of the U. S. Railroad Administration; served on an advisory committee to the U. S. Bureau of Mines, and in collaboration with the late John Hays Hammond gave assistance to the U. S. Coal Commission.

Eugene McAuliffe

S. M. Cassidy

S. M. CASSIDY has been appointed vice president of the Weirton Coal Co., operating in Pennsylvania. He has been manager of the company since joining the organization eight years ago.

H. C. LIVINGSTON, general superintendent, Union Pacific Coal Co., Rock Springs, Wyo., has been promoted to assistant general manager. Joining the company in 1927 as a draftsman and general engineer, he was promoted to acting assistant chief engineer in 1937, three months later was elevated to assistant chief engineer, was appointed chief engineer in 1940, and was promoted to general superintendent in 1941.

VERNON O. MURRAY, general superintendent, Union Pacific Coal Co., Rock Springs, Wyo., has been advanced to assistant general manager. He joined the company in 1930 as safety engineer and seven years later was assigned to duties as mine superintendent in charge of Rock Springs Mines Nos. 4 and 8, becoming general superintendent in 1940.

EMILE CRAMPE, at one time mine foreman at Saxton No. 1 mine of Walter Bledsoe & Co., Terre Haute, Ind., and later assistant mine foreman at Isabella mine of the Weirton Coal Co., Isabella, Pa., has become a federal mine inspector.

A. H. MANDT has been elected president of the Central Elkhorn Coal Co., Estill, Ky. He also is vice president and general manager of the Stephens Elkhorn Fuel Corp., Alphorette, Ky. TROY COMBS, vice president, Central West Coal Co., has been elected vice president of Central Elkhorn.

LEONARD E. ADAMS, formerly president of the Utah Coal Operators' Association and now a director, has been named president and general manager of the Royal and Spring Canyon Coal companies and the Standard Coal Co., Inc. He began his career in the coal industry in 1913 as store manager at the Spring Canyon mine.

Release Fuel Oil To Former Users

Consumers on the East Coast and the Middle West who heeded the request to convert heating equipment from fuel oil to coal or wood are to be allowed fuel oil if their equipment is changed back to use it, according to an announcement Oct. 24 by the Office of Price Administration.

The Petroleum Administration for War said in a separate announcement that the OPA action was based on "the improved fuel oil stock position." As PAW Administrator, Secretary Ickes warned, however, that the supply was not large enough to warrant an increase in current rations. In recommending the OPA action, Mr. Ickes told Chester Bowles, Price Administrator, that the conversions of heating equipment "were extremely helpful to us and were a big factor in enabling us to get through a very critical period."

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Names Group to Probe Canada Coal Industry

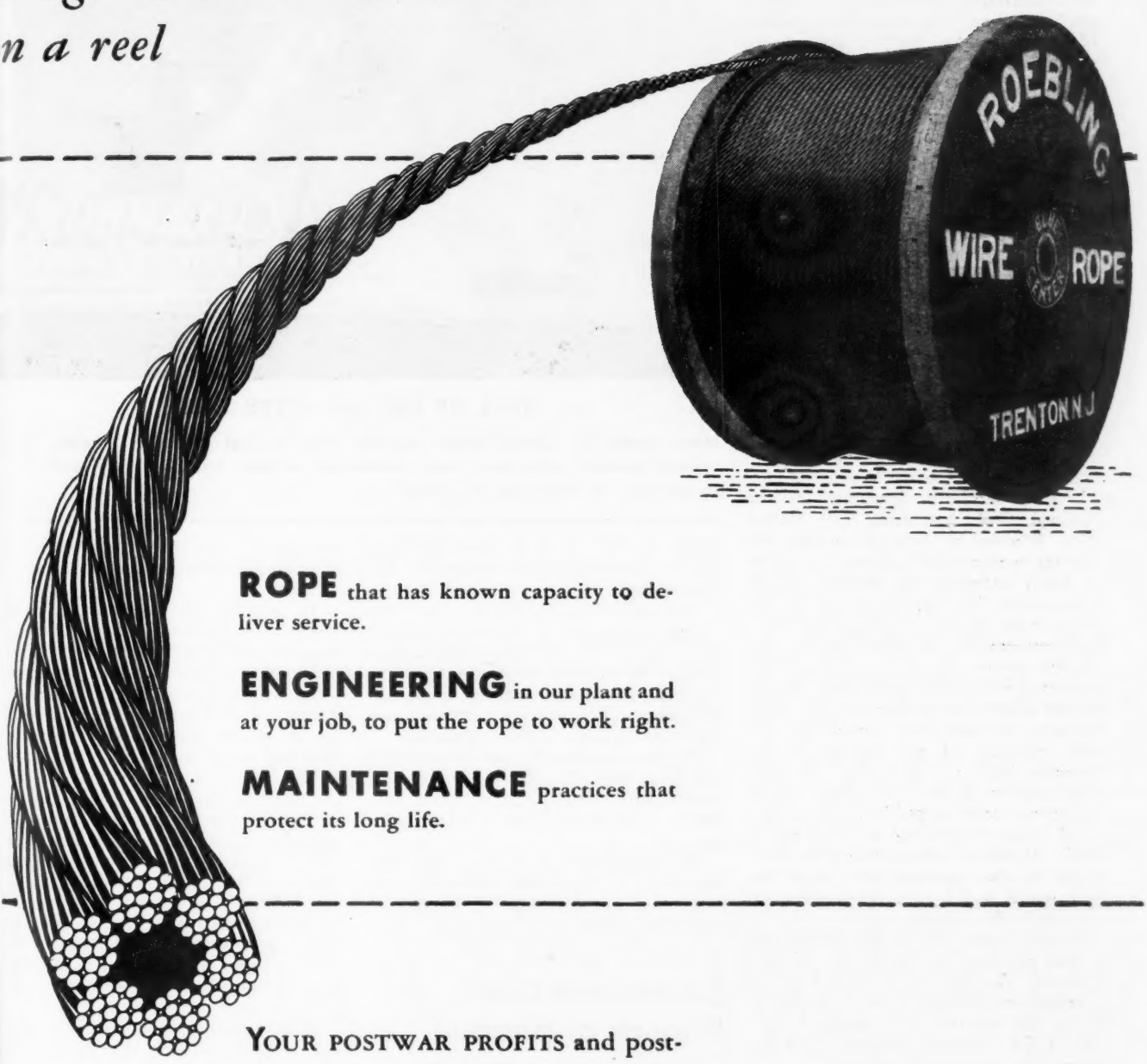
Prime Minister Mackenzie King has named the Royal Commission that is to inquire into the Canadian coal industry. Headed by Justice W. F. Carroll, Halifax, it will include Angus J. Morrison, an official of the United Mine Workers of America, Calgary, and Justice C. C. McLaurin, Calgary. The commission will report to the newly created Reconstruction Department headed by C. D. Howe, Minister of Munitions.

To ease the domestic coal shortage in eastern Canada caused by congestion of small anthracite at U. S. mines, the Canadian National Rys. has agreed to take delivery of 20,000 tons of No. 3 buckwheat. E. J. Bruning, Dominion Coal Controller, in a letter to R. C. Vaughan, chairman and president of C.N.R., expressed appreciation of the cooperation given by that carrier to the Department of Munitions and Supply.

Extensive coal properties along the Highwood River west of High River, Alberta, have been acquired by a syndicate of Canadian, British and American financiers, who plan to develop a mine there soon with an initial expenditure of $2,000,000, according to R. O. Sweezey, Montreal financier. Construction of a railway spur to the mine portal, about 42 miles west of High River on the Highwood River, and employment of 100 men at the opening of the mine are included in the syndicate's immediate program, said Mr. Sweezey.

Canada's apparent supply of coal for the first eight months of this year shows a slight improvement, thanks to greater imports, principally from the United States. Although the average working staff in the mines during the first seven months was 5 percent greater than in the corresponding period of 1943, production of Canadian mines was down 792,540 tons, or 7 percent, for the first eight months at 10,934,181, but imports showed an increase of 1,369,134 tons, or 9 percent, at 18,281,858 tons.

When you say, **"Make it ROEBLING**
'Blue Center'" *you buy a lot of things that can't be wound on a reel*



ROPE that has known capacity to deliver service.

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F.P.C. Orders Probe Of Natural Gas

The Federal Power Commission has ordered that "an investigation be instituted with respect to matters involved in the conservation and utilization of natural gas," including "the extent and probable life of natural-gas reserves; present and prospective measures for preventing waste and prolonging the life of such reserves; the present and probable future utilization of natural gas for domestic, commercial and industrial purposes; the extent, character and results of the competition of natural gas with other fuels; and such related matters as may be helpful in the administration of the Natural Gas Act or in determining what additional legislation, if any, should be recommended."

F.P.C. issued an order Oct. 12 dismissing an application of the Wisconsin Southern Gas Co. to take natural gas into southern Wisconsin as a substitute for manufactured gas. The National Coal Association, United Mine Workers of America and western railroads opposed issuance of a certificate.

Testifying at the rehearing of the Memphis Natural Gas case in Wasington Oct. 26, Tom McGrath, appearing for the National Coal Association and United Mine Workers of America, pointed out that the applicant had adduced no reason to justify changing the decision of the Commission. He emphasized that it was shown at the adjourned hearing that boiler-fuel consumption of natural gas on the pipeline system was 63.5 percent of the company's total sales rather than the 52 percent alleged at the first hearing. Furthermore, he said that, considering the rapid depletion of gas reserves in the Memphis field, the acquisition of additional reserves in the Lisbon field, which are proposed to be tapped by the applicant, would render the pipeline no better off in supply. It also was stressed that if the lines sought by the applicant were built the result would be a further displacement of coal largely for inferior uses.

Hearings began Oct. 19 on applications to take gas from the trunk line of the Tennessee Gas & Transmission Co. by Tennessee Gas Lines, Inc., Kentucky Natural Gas Co. and the utiltiy serving Louisville. T.G.L. received permission that its hearing be postponed indefinitely, the others continuing. The National Coal Association and other coal interests oppose the applications.

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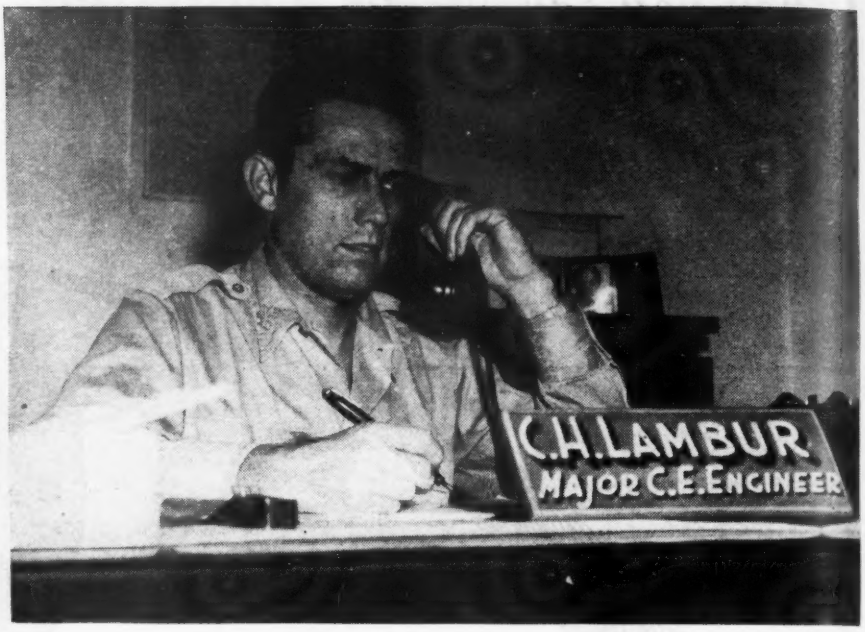
Smokeless Test Job About to Start

A $20,000 contract to conduct experiments in making Illinois coal smokeless has been let by the Illinois State Coal Products Commission to the Institute of Gas Technology, of Chicago, according to an announcement Oct. 11 by State Senator Rice W. Miller, chairman of the commission. The company will construct an oven to test the practicability of coking Illinois coal for use in St. Louis and other markets with anti-smoke ordinances, Mr. Miller said.

Methods to be tested are the Otto coking process and a fluidization process developed by the Institute of Gas Technology. In addition the institute will investigate a process patented by Corlus W. McKinney, a Belleville (Ill.) engineer, and report its findings to the commission.

"If these experiments are successful, it will mean that Illinois coal can go back into markets where it was barred by anti-smoke regulations," Mr. Miller commented.

The commission was set up by the 1943 legislature to investigate smokeless coal methods. It has been holding hearings for more than a year.



STILL ON THE JOB—OVER THERE

Major Charles H. Lambur, former assistant editor of Coal Age now on leave, though several thousand miles from home—somewhere in Italy—has been very much "down to business" for more than two years.

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Supervisors Cite Wrongs at Hearing

"A new, adequate grievance machinery set-up is very necessary and probably would do away with a lot of trouble we are having now," said a fireboss employed at the Ford Collieries Co., Curtisville, Pa., testifying Oct. 18 as the first witness before a War Labor Board panel taking testimony at Pittsburgh in a dispute affecting 114 mines in four states. The hearing grew out of strikes called by the United Clerical, Technical and Supervisory Workers' Union of the Mining Industry, Division of District 50, United Mine Workers.

Further charges were that the Ford company failed to enter into a contract and refused to pay for overtime work, with a supplementary allegation that a differential of 5 to 10 percent should be paid for night work. Most of the first day was taken up with elaborating on failure of the company to treat supervisory men the way the union contended they should be treated.

In rebuttal, H. S. Clark, president, Rochester & Pittsburgh Coal Co., outlined from his standpoint the duties of the various employees involved in the controversy. With Senator Edward R. Burke, president, Southern Coal Producers' Association, acting as counsel, Charles O'Neill charged that the bosses' union is a part of the U.M.W. general organization and that the move to organize separately is a violation of the union contract. He placed in the record a letter signed by union officials wherein local officers were urged to make efforts to bring such classes of workers into U.M.W.

On the witness stand Oct. 21, John McAlpine, president of the supervisors' union, gave testimony quite general in character, more in the nature of a speech on supervisory forces, foremen, etc.

Of the three-man "public" panel named Sept. 16 by the National War Labor Board, Murray W. Latimer, chairman, has withdrawn and been replaced by William Spohn, Madison (Wis.) attorney, who has served on various WLB panels. Lloyd G. Reynolds, professor of economics at Johns Hopkins University, declined appointment and his place was taken by Harry J. Dworkin, Cleveland (Ohio) attorney and a public member of the Cleveland Regional WLB. Charles Gregory, professor of law at the University of Chicago, named as the third member of the panel, remains.

A resolution made public Oct. 11 by the War Labor Board granted permission to bituminous operators to extend voluntarily all provisions of their agreement with the United Mine Workers to supervisory employees. WLB ordered that terms and conditions of employment provided by the supplemental wage agreement "must be

Increase Your Hauling Capacity 10% to 20% WITH LeTOURNEAU BUILT ROADS

Smooth haul roads enable you to use larger hauling units or move bigger loads faster with same hauling rigs. This operator is using 10-yard Tournatrailer (speeds up to 14.9 m.p.h.) on 7400-foot round trip. Trailer can be interchanged with Carryall Scraper on same Tournapull prime mover for stripping or roadbuilding or with Crane for lifting.

YOU CAN HAUL LARGER LOADS FASTER . . . REDUCE TRUCK & TIRE MAINTENANCE . . . ALSO USE YOUR LeTOURNEAU ROAD-BUILDING EQUIPMENT FOR STRIPPING, CLEARING, ETC.

Good haul roads, Coal Age reports, can increase the capacity of haulage units 10 to 20%. That means more coal hauled with fewer trucks and men. What's more, good roads cut wear and tear on trucks and tires, reduce gear shifting, stretch gas mileage.

Can you afford to pass up such savings when smooth roads with easy, load-increasing grades and curves are so easily built with LeTourneau Carryalls and Dozers?

One-Man Operation

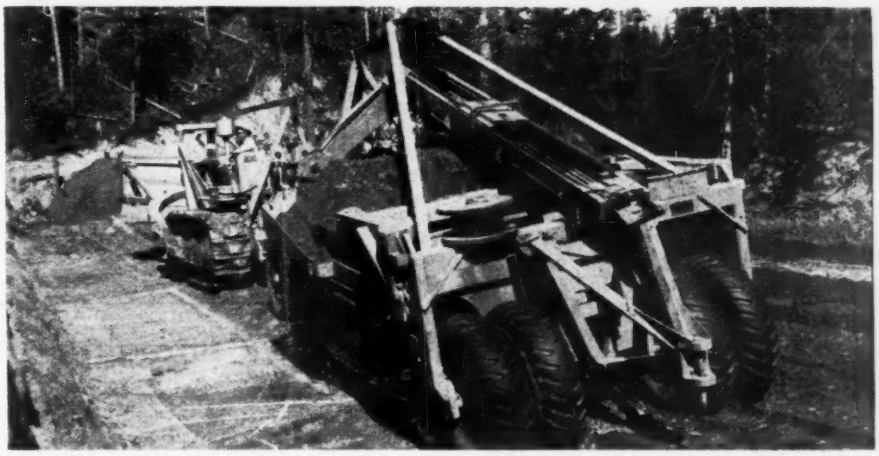
You'll save on equipment and manpower, too. The LeTourneau Carryall picks up its own load, then hauls and spreads that load. With it you can make deep cuts and fills, grade accurately, spread gravel, cut box or V drainage ditches and maintain your roads. No costly, extra loading, spreading or maintenance equipment needed. One man operates both Carryall Scraper and prime mover, whether high-speed Tournapull or crawler tractor.

Profit from Interchangeability

Once your roads are built, the same Carryall can be put to work reducing overburden removal costs. When using Tournapull, Carryall can be interchanged with big-capacity trailer for coal-hauling or crane for lifting. If Carryall is tractor operated, Dozer and Rooter can be operated from the same tractor for clearing trees, stumps, etc., or shattering hard, rocky material.

Planning Help Yours for Asking

For more complete information as to how LeTourneau equipment can help you, write our Field Engineering Dept.—expert earthmovers will gladly help you with plans, estimates and priority requirements. Address Dept. CA-1144, R. G. LeTourneau, Inc., Peoria, Ill.



Here LeTourneau Carryall and Dozer cut a wide, smooth haul road through the Potlach Forests of Idaho. Both Dozer and Carryall operate from the same 2-drum LeTourneau Power Control Unit at rear of tractor.

LETOURNEAU
PEORIA, ILLINOIS · STOCKTON, CALIFORNIA

Also, LeTOURNEAU (Aust.) Pty., Ltd., Rydalmere, N.S.W., Australia

Peoria, Illinois, U. S. A.

Manufacturers of TOURNAPULLS*, DOZERS, CARRYALL* SCRAPERS, POWER CONTROL UNITS, ROOTERS*, SHEEP'S FOOT ROLLERS, TOURNAROPE*, TOURNATRAILERS*, TOURNAWELD*, TOURNACRANES*.

*Trade Mark Reg. U. S. Pat. Off.

applied in full or not at all to all hourly paid management employees who are excluded from membership in U.M.W. bargaining units but who are covered by the Fair Labor Standards Act and employed in job classifications immediately interrelated with those of employees covered by this agreement."

Employers were permitted to transfer these employees from salary to an equivalent hourly rate to make the permissible wage adjustment and were empowered to pay the $50 vacation allowance and $40 in full settlement of amounts due for portal-to-portal pay from April 1 to Nov. 3, 1943. Office employees were specifically excluded by WLB.

•

To Build Coal Dock At Catlettsburg

Work will start as soon as possible on construction of a $500,000 loading dock at Catlettsburg, Ky., by the Utilities Elkhorn Coal Co. for the shipment of coal on the Ohio River. John E. Bowman, vice president and general manager, said that the plant would have a loading capacity of 2,000,000 tons a year and a storage capacity of 250 railroad cars. The construction is planned on a property having 2,300 ft. of river frontage situated on the Catlettsburg-Ashland border acquired by the coal company in 1937.

•

Miners Blamed For British Coal Lag

Absenteeism among younger miners, coupled with exhaustion of the older ones, is blamed for a drop of 100,000 tons a week in output of British coal, as a result of which the nation's fuel position will be no better than last winter. This was revealed in the House of Commons Oct. 3 by Gwilym Lloyd George, Minister of Fuel, in reply to questions, according to a dispatch to the New York *Times*.

Emanuel Shinwell, Labor member, one of the questioners, asked whether the report by the American Mining Section of the Combined War Resources Board had not indicted the whole organization of the British mining industry and exonerated the miners. The Fuel Minister refused to concede that the report quite said that. Nor would he agree that the main problem was the increasing age and exhaustion of the miners, as the highest rate of voluntary absenteeism was among the younger men. He said the production per man had fallen a quarter of a ton a week because of 25 percent more absenteeism and that the increased output expected from the wage agreement of last April had thus not materialized.

The Minister of Fuel, it was announced Oct. 3, had appointed a committee of mining engineers to advise what changes would be necessary to bring the industry to a state of full technical efficiency. Greater mechanization, said to have been recommended by the American mission, is to be one of the subjects to be considered.

Although fighting in some parts of the mine regions of Limburg, in southern Netherlands, was still going on Oct. 1, the majority of the Netherland coal mines in South Limburg had been freed, according to Brussels newspapers. It was estimated that it would take several months to start mining operations again, as the Germans —although they left the shafts intact— systematically destroyed surface installations, which will be difficult to replace.

•

Coal-Mine Fatalities Show Sharp Decline

Accidents at coal mines of the United States caused the deaths of 75 bituminous and 14 anthracite miners in August last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors.

With a production of 54,220,000 net tons, the accident death rate among bituminous miners in August last was 1.39 per million tons, compared with 3.11 in the preceding month and 2.19 in August, 1943.

The anthracite fatality rate from accidents in August last was 2.51, based on an output of 5,588,000 tons, against 2.39 in the preceding month and 4.15 in the eighth month of 1943.

For the two industries combined, the accident fatality rate in August last was 1.49, compared with 3.04 in the preceding month and 2.38 in August a year earlier.

Fatalities during August last, by causes and states, as well as comparable rates for the first eight months of 1943 and 1944, were as follows:

U. S. COAL-MINE FATALITIES IN AUGUST, 1944, BY CAUSES AND STATES

	Underground									
State	Falls of Roof	Haulage	Gas or Dust Explosions	Explosives	Electricity	Machinery	Total Underground	Open-Cut	Surface	Grand Total
Alabama	1	1	..	..	1	..	3	..	..	3
Arkansas	1	..	..	..	..	..	1	..	..	1
Colorado	..	2	..	1	..	..	3	..	..	3
Illinois	4	..	..	..	..	1	5	..	..	5
Indiana	2	2	..	..	..	..	4	..	..	4
Kentucky	7	4	..	1	..	..	12	..	..	12
New Mexico	2	1	..	..	..	..	3	..	..	3
Ohio	3	..	..	..	..	..	3	2	..	5
Oklahoma	..	..	1	..	..	..	1	..	..	1
Penna. (bit.)	5	1	..	..	..	..	6	..	1	7
Tennessee	1	..	..	..	..	..	1	..	..	1
Utah	..	1	..	..	..	..	1	..	..	1
Virginia	1	..	..	..	1	..	2	..	..	2
West Virginia	11	8	..	..	1	..	20	..	2	22
Wyoming	3	..	..	..	1	..	4	..	1	5
Total bituminous	41	20	1	2	4	1	69	2	4	75
Penna. (anth.)	6	1	1	3	..	..	11	1	2	14
Grand total	47	21	2	5	4	1	80	3	6	89

DEATHS AND FATALITY RATES AT U. S. COAL MINES, BY CAUSES OF ACCIDENTS*

January-August, 1943 and 1944

	Bituminous				Anthracite				Total			
	Number Killed		Killed per Million Tons		Number Killed		Killed per Million Tons		Number Killed		Killed per Million Tons	
Cause	1943	1944	1943	1944	1943	1944	1943	1944	1943	1944	1943	1944
Underground:												
Falls of roof and coal	454	360	1.168	0.853	74	53	1.855	1.212	528	413	1.232	0.887
Haulage	161	144	.414	.341	24	16	.601	.366	185	160	.432	.343
Gas or dust explosions:												
Local	23	7	.059	.017	1	2	.025	.046	24	9	.056	.019
Major	124	22	.319	.052	...	...	....	....	124	22	.289	.047
Explosives	20	11	.052	.026	6	12	.150	.275	26	23	.061	.049
Electricity	28	23	.072	.054	...	2	....	.046	28	25	.065	.054
Machinery	15	20	.039	.047	1	...	.025	....	16	20	.037	.043
Shaft	6	3	.015	.007	1	4	.025	.091	7	7	.016	.015
Miscellaneous	23	86	.059	.204	8	9	.200	.206	31	95	.072	.204
Stripping or open-cut	18	18	.046	.043	8	5	.200	.114	26	23	.061	.049
Surface	47	30	.121	.071	16	9	.401	.206	63	39	.147	.084
Total	919	724	2.364	1.715	139	112	3.482	2.562	1,058	836	2.468	1.794

* All figures subject to revision.

Setting It Straight

In the article entitled "Hard Sheaves Save Ropes and Prevent Steel Waste," in our September issue, an error crept into the table on p. 99. The figure for manganese steel in column 1 should have been 2,500 instead of 250. The corrected table, therefore, reads as follows:

SAFE UNIT BEARING PRESSURES OF ROPES ON VARIOUS MATERIALS IN SHEAVES
(Pounds per Square Inch)

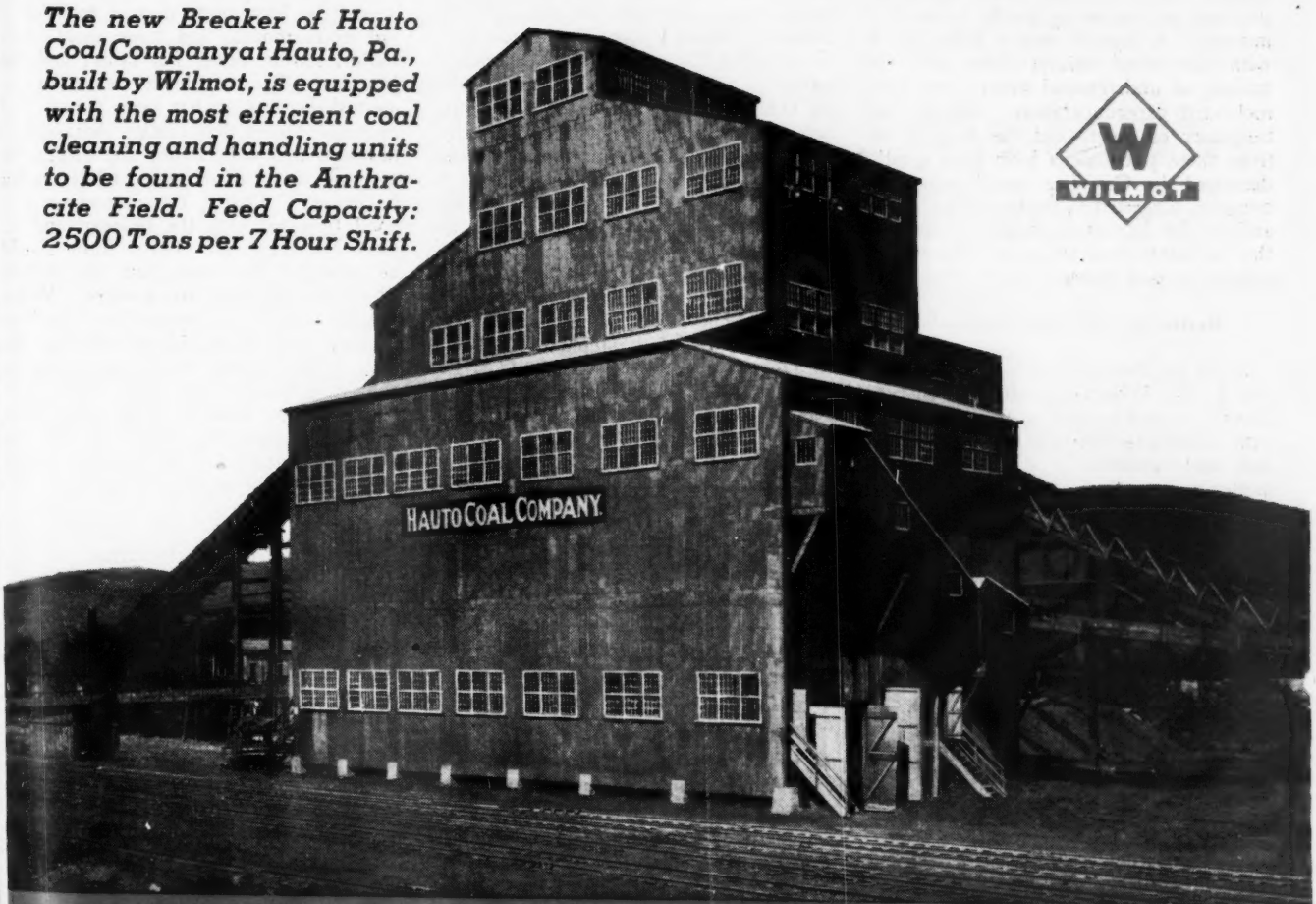
	Regular-Lay Ropes		Flattened-Strand Ropes
Material	6x19	6x37 8x19	
Gray cast iron	500	600	800
Carbon steel casting	900	1075	1450
Manganese steel	2,500	300	....

Note: For Lang-lay ropes, the values given for regular-lay ropes may be increased 15 percent.

NEW HAUTO BREAKER

Designed, Built, Equipped BY WILMOT

The new Breaker of Hauto Coal Company at Hauto, Pa., built by Wilmot, is equipped with the most efficient coal cleaning and handling units to be found in the Anthracite Field. Feed Capacity: 2500 Tons per 7 Hour Shift.



W
WILMOT

In Your Post-War Planning . . .

Consider the tremendous advantages of *speed, economy, and efficiency* in coal preparation . . . all outstanding features of breakers built by Wilmot.

Wilmot *Hydrotators* and auxiliary preparation equipment are capable of handling larger tonnages than before thought possible. In peacetime, as now, breakers built by *Wilmot* will show exceptional yields and maintain high quality standards to meet tomorrow's competition.

In your future construction plans remember that "WILMOT BUILDS BETTER BREAKERS."

WILMOT ENGINEERING CO., *Foundry and Shops:* WHITE HAVEN, PA. **HAZLETON, PA.**

Coal Section Starts Operations

Methane Checking and Control, Ventilation for Maximum Safety and Efficiency, Timbering, Training of Miners and Control of Rock Bursts Discussed by N.S.C.

MEETING separately for the first time, the newly organized Coal Mining Section of the National Safety Council held two sessions at Chicago, Oct. 3 and 5, to discuss problems in ventilation and methane control, mine accident rates, safety instruction and timbering specific to the coal industry. A separate session held Oct. 4 with the metal miners dealt with the training of underground workers and with rock-burst experimentation. Because the frequency of bursts and the loss of life from these phenomena have been greatly decreased in Canadian metal mines by measures suggested by studies in the mines and in the laboratory, hope is held out that accidents from this cause also will be reduced in coal mines.

Reducing Methane Hazards

In all the Pittsburgh Coal Co.'s mines, said J. W. Whittaker, safety instruction director, a weekly check of the air is made with a methane detector by a competent man and, wherever it is suspected that methane liberation may increase, tests with the methane detector are made in the suspected area. If excessive liberation continues, the detector is kept in the mine, and the foreman makes hourly tests and, should the percentage rise too much above normal, the section is stopped until the liberation decreases to a safe quantity.

Care is taken not to pass return air over a trolley wire. In a series of panels, drawn on continuous retreat, the split of air starts at one or the other end of the goaf line and, as it moves along that line and passes a producing entry, additional air is fed into it through a regulator at the entrance of each such entry, in quantity depending on the ventilation needs of the workings in that particular panel. The quantity of air necessary for each split on this system probably will be greater than in older working areas, but this it is hoped will be compensated by greater working activity in new areas. A continuous unobstructed airway, of course, has to be maintained along the goaf line.

To prevent explosions being started by explosion-proof machinery, each assistant mine foreman is given a "feeler gage" with a single blade 0.004 in. thick. The foreman is required to make inspections and to report, in writing, on these every week. Before leaving the shop, all covers are fitted to close so as to leave no more than a 0.002-in. opening. If the assistant foreman finds a cover that does not fit with the desired precision, the equipment to which it belongs is taken out of service immediately.

As working faces advance, the cutting crew in mechanical loading places and the hand loaders in other rooms rock-dust each cut to within two cuts of the face, using 4 lb. of dust per linear foot of advance. Firebosses report on any inadequacy of the rock-dusting of the mine face and fence off such places. Each mechanical loading crew has two explosive boxes. On the off-shift, one box is delivered to a designated spot and the other box is taken out with all the explosives leftovers. Hand loaders also receive powder in off-shifts and get only as much as served in a previous shift. Cardox tubes are charged on the surface. Mining machines in dusty mines, hand and mechanical, are equipped with sprays and integral tank trucks, water usually being taken to machines in tank cars, generally on the off-shift, though some water pipes are used.

Management needs to be as solicitous about the possible failure of the mine fan as of the failure of loading and cutting equipment, declared Stephen Krickovic, assistant chief engineer, Koppers Coal Division. When the anti-friction bearing of a propeller fan fails, it may cause a disaster. In one instance, it fortunately failed to do this, but entailed a production loss of 8,500 tons of coal and an expense for replacement of $4,200. However, lightning may be just as inconsiderate as a defective bearing.

Periodic inspections, he added, are needed at least once in two months, if not every month, and these must cover motor, starter, drive, fan blades and fan bearings. The fan blades must be examined because it has been found that propeller blades may crack. Anti-friction bearings, inclosed as they are within the cowling, cannot be examined while the fan is running. During the inspection is a good time to clean the bearings and replace the lubricant. On a form should be recorded for every part the defects which the inspection has revealed. When a mine is wet, the pumps must be kept running, and, if the fan is idle and the mine is full of gas, the pumpers may be obliged to forsake their posts, thus flooding the mine. Even if all the men below ground get out of the mine safely after the fan stops, hazards are involved in moving large volumes of methane from the workings.

Standbys Advocated

Each mine producing 3,000 tons or more daily in two shifts and liberating from active areas 750,000 cu. ft. of methane in 24 hours should have duplicate ventilating units, one working and one idle. The standby unit would cost $15,000 to $17,000, which, amortized in 20 years, would add 0.15 mill per ton to the coal cost. Methanous mines producing a lower tonnage could use their displaced centrifugal fans as standbys. A complete extra assembly of shaft, pillow block and bearings is desirable in this instance. Other methanous mines should provide a fan having a drive with two motors of equal capacity set on the same foundation and located on either side of a common pulley in a belt-drive set-up, and here also a complete assembly of fan shaft, pillow blocks and bearings should be held as a spare. This would cost from $3,000 to $5,000. With mildly gassy or non-gassy mines producing 1,000 tons or less daily, a spare fan motor kept in a convenient spot so that it can be quickly installed on the one base will supply the needed protection.

Fan-bearing thermostats and fan-stoppage signals, both audible and blinking, also are desirable. When a noisy fan ceases to run, declared Mr. Krickovic, the silence that follows does not always impress the men who should take action, even though the fan may be located close to the main plant. Mr. Krickovic suggested ways in which electric substations could be thrown out of operation as soon as the air pressure in the mine changes appre-

Coal Section Officials

Officers of the Coal Mining Section of the National Safety Council for the 1944-45 term were chosen as follows at the Chicago meeting:

General chairman — Thomas Moses, ex-president, U. S. Steel Corp. of Delaware.

First vice chairman—Edgar C. Weichel, mining engineer, Hudson Coal Co.

Second vice chairman—J. T. Ryan, Jr., general manager, Mine Safety Appliances Co.

Secretary—R. H. Nicholas, chief inspector, Pittsburgh Coal Co.

Executive committee — Richard Maize, Secretary of Mines for Pennsylvania; C. L. Lutton, safety engineer, H. C. Frick Coke Co.; Robert M. Medill, director, Illinois Department of Mines and Minerals; Thomas Allen, chief mine inspector, Colorado; Walter N. Polakov, chief engineer, United Mine Workers of America; Richard T. McAllister, president, Illinois Miners' Examining Board; J. J. Forbes, chief, U. S. Mineral Production Security Division; G. W. Grove, supervising engineer, District A, coal mine inspection division, U. S. Bureau of Mines; John E. Jones, safety director, Old Ben Coal Corp.; Harry R. Owens, State mine inspector, Trucksville, Pa.

DRY SAND for Mainline Haulage

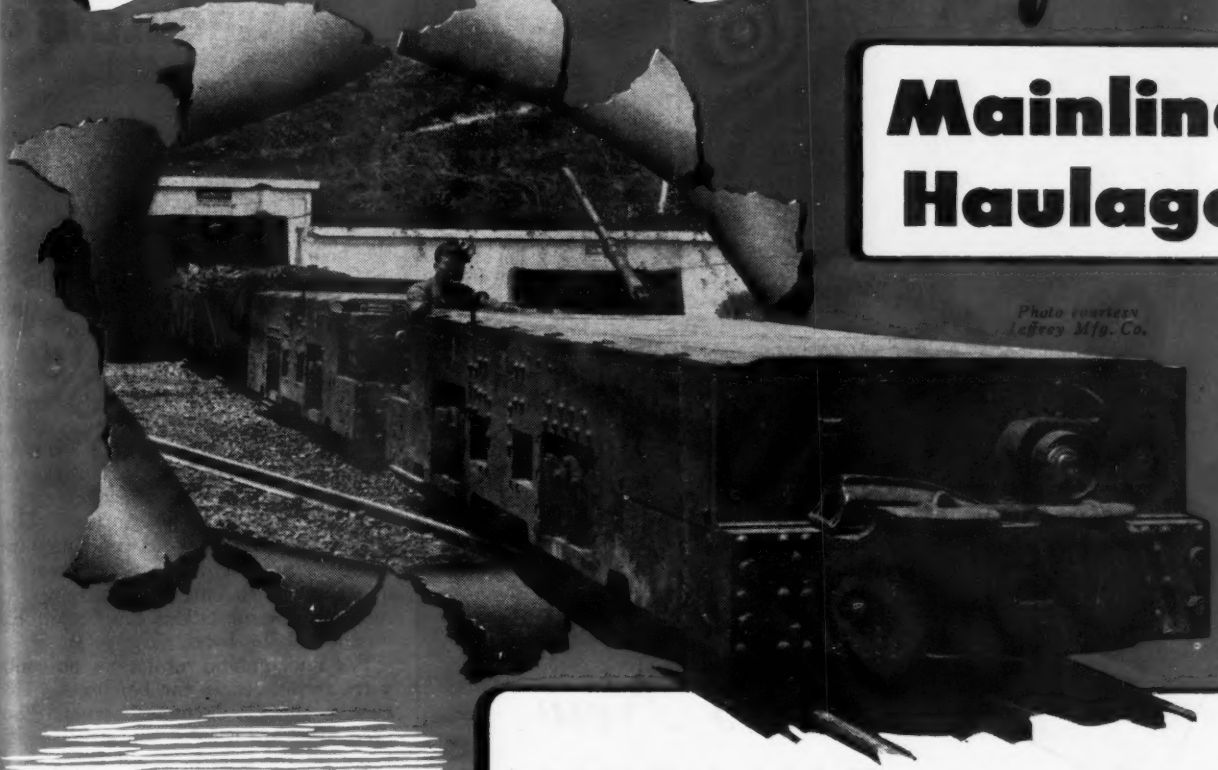


Photo courtesy Jeffrey Mfg. Co.

Tonnage moves *fast* on a well-sanded track. Sand, applied at the right times, when driving wheels start to slip at sharp turnouts or on ruling grades, gives sure traction when pulling a full trip. For example, a light switcher struggling with 50 ton mainline cars needs sand—*dry sand*—to get them started.

The Coal Mine Model of the "Perfection" Cone Stove Sand Drier delivers 8 to 10 tons of DRY sand in an 8-hour period . . . and can be supplied to produce 12 to 14 tons in 8 hours. In addition, your costs are *halved* in comparison with ordinary methods! This results from savings both in fuel and labor required.

Prove these facts in your own operations. Write *today* for details on our 30 DAY FREE TRIAL offer.

Princeton's facilities include Pattern Shop, Machine Shop, Grey Iron and Bronze Foundries for production of a wide variety of mining parts and accessories. Write for product lists.

PRINCETON FOUNDRY & SUPPLY CO.

PRINCETON, WEST VIRGINIA

This New

BULLETIN

gives complete information covering

MODERN

STEEL COAL MINE CARS

Write for Bulletin No. 72-H Today. From cover to cover it is filled with illustrations, specifications and other technical data, pertinent to modern low cost mine haulage equipment. Our engineers will be glad to work with you in developing equipment to exactly meet your specific coal transportation requirements.

PRESSED STEEL CAR COMPANY, INC.
INDUSTRIAL DIVISION
PITTSBURGH, PA.

ciably or fails entirely, thus preventing their units from igniting methane.

For the outside stations, the plan requires that two rubber-covered wires, No. 12 or larger, depending on the depth of the hole, be placed in power bore-holes, with a connection through a relay to the low-voltage release on the oil circuit breaker in the substation and to a metal vane mounted with a mercury switch in a permanent stopping window near the borehole. When the pressure differential across the window and vane is reduced considerably or to zero, the vane will drop to the vertical position, breaking the circuit in the mercury switch and, in turn, at the oil circuit breaker. Upon safe restoration of mine ventilation and upon receipt of instructions from the mine superintendent, and no sooner, the substation or substations can be put back on the line by hand.

For underground substations no control wires are needed in the boreholes. However, as the a.c. disconnects remain "hot" even after the power conversion unit is taken off the line, it would be necessary, if the ventilation interruption is extended beyond the safe time limit, to deenergize at the hole the circuit on the surface.

If it is found impractical with surface substations to place the control wires in the existent boreholes, a somewhat less effective solution than the foregoing can be obtained by installing at the foot of the borehole a hand-operated d.c. circuit breaker, connecting it with the mercury switch on the vane in the window already described. Here, as with inside substations, any lengthy fan stoppage would require that the circuit on the surface be disconnected.

One well might object that in all three of the foregoing plans frequent short a.c. power outages at the fan would cause considerable inconvenience and possibly some loss in production at mines where substations are not readily accessible and have no attendants. Fortunately, however, a.c. power interruptions usually are infrequent and a reasonable assurance of safety offers an adequate compensation for expenditure, even if, under exceptional circumstances, the assurance may fail. Unquestionably, positive power-outage control is essential in gassy mines. Telephones, cars or trucks in winter, and even a sur-

CUT PREPARATION COSTS

with larger holes wider spaced

Better fragmentation and a big decrease in cost per foot drilled — that's a big reason why many strip mine operators are swinging to the large 9-inch to 12-inch holes drilled with the Bucyrus-Erie 42-T. Easier to load than small holes and having much greater powder capacity, the larger, wider spaced holes mean less drilling per yard of bank prepared and more yardage per move and setup.

It takes a big, powerful drill like the 42-T to put down the large diameter holes. With its 46-foot derrick, its rigid construction, high speed drilling action, and fast sharp upstroke, the 42-T swings up to 6,000 pounds of tools . . . and puts down large diameter holes as rapidly as other machines drill 6 to 8-inch holes.

It's easy to take advantage of the increased tonnage and decreased drilling costs that come with larger holes. Write for details on the blast hole drilling economy that will be yours with the 42-T.

H-52C

SO. MILWAUKEE **BUCYRUS ERIE** WISCONSIN

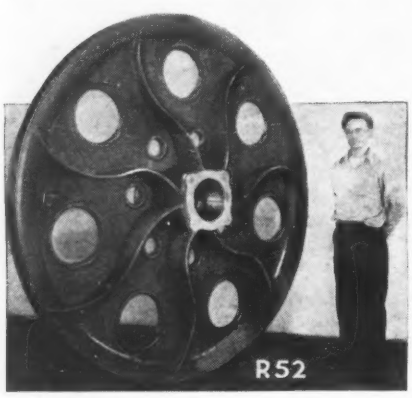
How Manganese Steel Sheaves "Save The Wire Rope"...

Sheaves for shaft hoists and other mining duties can often be bought at lower prices than are charged for manganese steel sheaves, but the immediate saving is deceptive. Any cable manufacturer will tell you that real economy lies in reducing the wear on the rope.

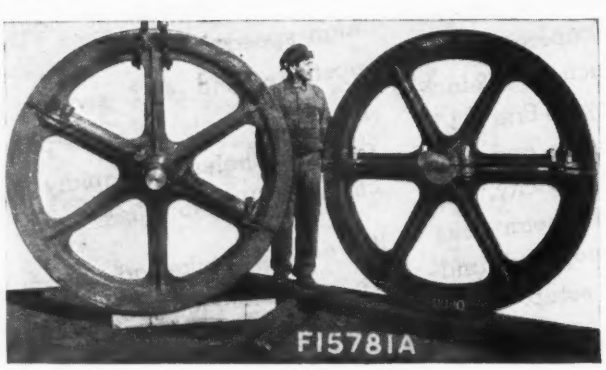
This is best done by installing austenitic manganese steel sheaves, which, because of the work-hardening property of the steel, avoid several destructive factors found in soft groove metal. Its structure is dense and wear-hard, so that the groove does not corrugate or cut to abrade or pinch the cable. Moreover, a manganese steel groove takes on a glass-like polish and does not supply tiny splinters to enter the rope strands and cut them.

Besides assuring longer rope life, manganese steel sheaves are too tough to break and, in themselves as wearing units, justify any premium you may pay over the cost of soft iron or ordinary steel wheels.

Ask the rope manufacturer! And ask us for Bulletin 743-M describing all the uses for manganese steel in the mining industry.



R-52 — This big boom point sheave, used on one of the gigantic stripping shovels working in Illinois, is one of the largest manganese steel sheaves made as a one-piece casting. Weight 2,832 lbs., groove diameter 82⅝". F-15781A—Two 68" split sheaves for a mine shaft head works. Weight 1,465 lbs. each.



The features of Amsco Renewable Lip Dippers are covered in Bulletin 641-D.

Amsco
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois
AMERICAN Brake Shoe COMPANY
FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO.
OFFICES IN PRINCIPAL CITIES

COMING MEETINGS

- **West Virginia Coal Mining Institute: 37th annual meeting, Nov. 24, Daniel Boone Hotel, Charleston, W. Va.**
- **Coal Division, American Mining Congress: tenth annual conference, Dec. 14 and 15, William Penn Hotel, Pittsburgh, Pa.**

face net of control wires strung on power poles between various stations and operated from a central point, will fail to give sufficiently speedy service.

To meet the abruptly fluctuating methane percentages accompanying mechanical mining, regulation is desirable such as will permit 0.3 to 0.5 in. of water gage to be introduced into a normally open split or splits whenever developing headings have to be ventilated, so that air volume may be adjusted quickly to the quantity of methane to be removed. Although, at first thought, the idea may seem extravagant, it is advantageous whenever full-time production is desired, because, without stopping the fan, corrections then can be made of any excess in the methane-air percentages.

In seams with average or weak roofs, little or no concern has been manifested in the maintenance of main headings except those used for haulage, it being reasoned that, when many headings have been driven, sufficient openings will remain for air flow even after caving, and the development cost per ton will be lowered. This viewpoint overlooks the high cost of extracting the many chain pillars, most of which will be surrounded by caves, and in removing the barrier pillars between two too widely separated goafs, because there will be too many headings for proper roof control. But Mr. Krickovic's observations of mining of this type have shown that the extra cost of such a prodigality of ill-supported headings considerably more than offsets the gains in production during development.

Moreover, the belief that enough area will be left in the airways even after some of them cave is fallacious. In one case, thirteen headings were driven in a group, five as intakes and eight as returns. The seam thickness was about 48 in. and all the return airways were 22 ft. wide and cross-timbered under the original top with two end posts and one in the center. At the time of observation, relatively few falls had occurred in the airways.

However, even a small fall practically neutralized the airway between crosscuts, which, incidentally, were also heavily timbered. Although theoretically 480 sq.ft. of area was to be open to air flow, the equivalent effective area was only 150 sq.ft., causing the need for much extra water gage. This example does not involve caved headings, but the results are the same. Today there is a trend away from the school of thought sponsoring the idea of many headings with little or no upkeep to the school of few headings with maintenance for all of them.

As an illustration of this idea, consider a mine in a seam of thin or medium

Conveyor Belt at a large coke plant. Friction and covers are entirely G. O. P. FLEXLASTICS— no natural rubber, the first made. Belt shows no effects of oil or abrasion, after 8 years.

★ ★

PARANITE Oil-Proof FLEXLASTICS Conveyor Belt, part of 4,000 ft. at an Eastern power plant, the largest of its kind. Installed 1940. Note condition of belt as it flexes over pulley.

- 8 years' uninterrupted service

1936 saw the start of widespread adoption of oil-treated coal and coke by power and coke plants. With it came the need for conveyor belts that were oil-proof. For this, MANHATTAN developed suitable synthetic rubber compounds with flexibility, lasting service and elasticity—those qualities now symbolized by FLEXLASTICS*. New Strength Members were developed concurrently. These with the new G. O. P. (gas-oil-proof) FLEXLASTICS combined to produce in **1936 the first all-synthetic belt** with the inherent characteristics needed.

Today that first PARANITE-G. O. P. Oil-Proof Conveyor Belt, pictured above, after 8 years' service still performs efficiently in carrying hot coke to the top of a truck-loading hopper where oil is sprayed to render the coke dustless.

Another notably early MANHATTAN installation, in the largest oil-treated coal plant in the country, continues to give highly satisfactory service. These conveyor belts totaling 4,000 feet show little signs of wear and no effects of oil after nearly 6 years' service.

While MANHATTAN'S PARANITE-G. O. P. Oil-Proof Conveyor Belts are available today only under war-restrictions, they will be ready to serve you when Peace returns.

14 ADVANTAGES • 1. Not affected by oil • 2. Will not soften • 3. Cover will not swell, buckle or peel • 4. Less coal spillage • 5. Runs straighter on idlers • 6. Less ply separation • 7. Flexes better over small pulleys • 8. Resists abrasion • 9. Resists destructive effects of heat better • 10. Non-spark (out for duration) • 11. Mildew-proofed fabric (where required) • 12. Increases production • 13. Has longer life • 14. Reduces cost.

** The term FLEXLASTICS is an exclusive MANHATTAN trade mark. Only MANHATTAN can make FLEXLASTICS.*

KEEP AHEAD WITH MANHATTAN

THE MANHATTAN RUBBER MANUFACTURING DIVISION
OF RAYBESTOS-MANHATTAN, INC.
EXECUTIVE OFFICES PASSAIC, NEW JERSEY

When every minute counts • • •

"VENTUBE"*

CAN HELP YOU PRODUCE MORE TONS PER HOUR!

Many leading mines use this flexible, rubberized duct to help workers stay on the job and step up working efficiency!

How to use "VENTUBE":

1. **Attach to blower** of adequate air capacity, with permissible motor and proper ground connections.
2. **Suspend on guy wire** from roof or high on timbers, out of the way of other equipment or rubble.
3. **Place blower** at least 15 feet upstream from the last drift or crosscut, *in the main air stream*, so as to avoid recirculation of air returning from face. Blower must have unobstructed intake.
4. **Place "Ventube"** so as to avoid sharp bends or kinks which interfere with air flow.
5. **Operate blower** only when outside fan is in operation. Stop blower when air velocity drops at entry.
6. **Before starting blower,** examine the face.
7. **Keep "Ventube"** in operation along with outside fan.
8. **Before shooting,** shut off blower. Push back "Ventube" 100 feet from the face.

What "VENTUBE" can do for you:

Used in the above manner, Du Pont "Ventube" sweeps the face with clean, fresh air. It helps remove dust and bad air from any space a man can enter . . . clear the face quickly after blasting. It speeds the coal cycle . . . helps workers produce more coal faster. And it guards health . . . helps keep workers on the job. Coated and impregnated with a special chemical compound, "Ventube" resists abrasion, heat, moisture, mildew, dry-rot, acid and alkaline waters. Can be easily repaired. Use "Ventube" the *right way* and you can't go wrong! E. I. du Pont de Nemours & Co. (Inc.), "Fabrikoid" Division, Fairfield, Conn.

NOTE: *War Production Board regulations permit us to supply "Ventube" for all mining purposes. To expedite delivery, it is urged that you furnish us with complete priority information on your orders.*

*"VENTUBE" is Du Pont's registered trade mark for its flexible, rubberized ventilating duct.

DU PONT
REG. U.S. PAT. OFF.

DU PONT "VENTUBE"

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

Equipment Approvals

Three approvals of permissible equipment were issued by the U. S. Bureau of Mines in September, as follows:

Jeffrey Mfg. Co.—Type 35BB (British Jeffrey Diamond) shortwall mining machine; 50-hp. motor, 500 volts, a.c.; Approval 517A; Sept. 4.

Goodman Mfg. Co.—Type 91-C-12 chain conveyor; 15-hp. motor, 440 volts, a.c.; Approval 518A; Sept. 8.

Goodman Mfg. Co.—Types 23816 and 23818 distribution boxes—three branch circuits; 250 and 500 volts, d.c.; Approvals 519 and 519A; Sept. 14.

thickness with roof generally requiring support. It has been predetermined in this mine that an open area of 150 sq.ft. is required in each group of intakes and returns. Under one set-up, six or seven headings would be driven, slating only the haulway and part of the adjacent intake for a sidetrack, and timbering all headings with run-of-mine headers and posts. Under another scheme, the required areas would be provided in four headings, which means that all would be slated and timbered permanently. An actual comparison of the estimated initial costs for the two set-ups will show no advantage for either. However, from the standpoint of maintenance, ventilating power cost and the lower cost of mining chain pillars not only few in number but with many less caves surrounding them the latter scheme will afford a definite advantage.

Driving of main headings is a construction job and should be considered as such. Any scheme of development designed to reduce the initial mining cost must be reckoned in the light of resultant future costs. If roof support is required, permanent timber by all means should be used in such main airways as have an anticipated life of five years or more. With ordinary timber, the extra cost is not only that of retimbering, which in itself is great, but also that of removing loose rock above the broken timber, together with the larger and longer timber required and the greater cost of setting it.

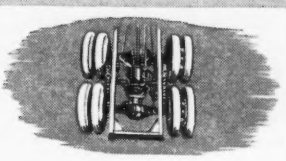
Finally, with permanently timbered airways, a constant flow of air will be assured at an economical cost, and it will be safe to inspect the main airways regularly to make certain that they are being kept open.

Accident Rates

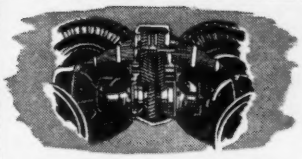
The fatality rate for American coal miners is 27 percent higher than that of all gainfully employed males between 15 and 64 years of age, asserted W. N. Polakov, chief engineer, United Mine Workers, adding that the frequency rate in the last two years reached 67.62 and 70.44, or nearly five times the average for all industries, while the severity rate was nine times as great as in all other industrial occupations. In 1942, mine accidents caused a shortage of manpower equal to over

6 REASONS

WHY YOU SHOULD IMMEDIATELY CONVERT YOUR 1½-2 TON MEDIUM TRUCK INTO A HEAVY DUTY TRUCK WITH THE THORNTON FOUR REAR WHEEL DRIVE

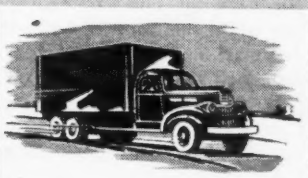


2 DRIVING AXLES under the load gives 100% more traction and 100% more payload capacity

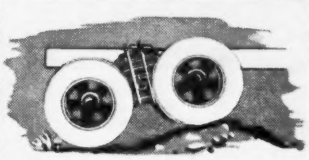


2 SPEED GEAR CASE, mounted between driving axles, doubles motor torque and rim pull.

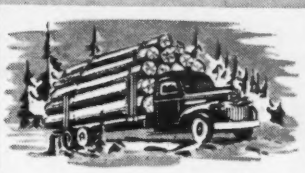
CLIMBS STEEPER GRADES as result of doubling torque and rim pull.



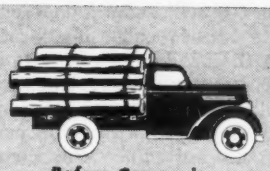
SPEED **FOR THE HIGHWAY** results from high-speed gear ratio in gear case.



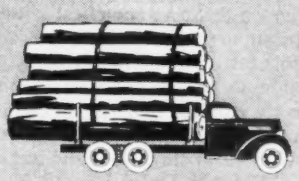
"WALKING" BEAM TYPE SPRINGS maintain maximum traction and decrease shock loads by 50%.



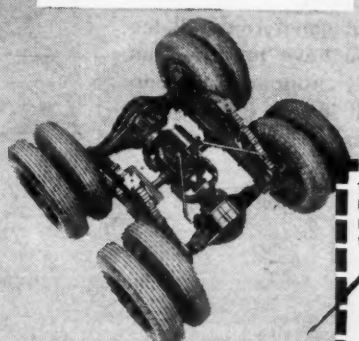
THORNTON 2-SPEED BOGIE insures successful off-highway operation.



Before Conversion



After Conversion
CUTS HAULING COSTS



This is the Thornton Drive, consisting of 2 driving axles, 2-speed gear case assembly, "Walking Beam" type springs; wheels; tires.

Thornton Tandem Co., 8715-F Grinnell Avenue
Detroit 13, Michigan, U.S.A.
Please send me free catalog of facts on changing my 1½-2 ton truck into a heavy duty truck.

Name_____
Address_____
City_____ State_____
Make of Truck_____ Year_____
Used for_____

THORNTON TANDEM COMPANY • 8715-F GRINNELL AVE., DETROIT 13, MICH.

"We like Schramm Air Compressors because they're versatile. That's the important thing in coal mine operations!"

A mine foreman in West Virginia was talking. He rattled off ten or twelve uses to which they put Schramm, starting with rock drilling and ending with cleaning machinery. That, he said, was why Schramms were so useful in his mine operations.

Do you need a compressor that can furnish all the air you want—for any job you have to do? Then turn to Schramm. Lightweight . . . rugged . . . compact . . . they're features you'll like in a Schramm. Write today for descriptive data.

SCHRAMM INC. THE COMPRESSOR PEOPLE WEST CHESTER PENNSYLVANIA

55,000 man-years. These losses, capitalized at 6 percent interest, represent a fund of $5,500,000,000.

At the present rate of coal production, the American coal industry loses $1,000,000 a day through accidents alone. In round figures this total is composed as follows:

Compensation insurance	$ 28,000,000
Indirect expense	140,000,000
Medical expenses	2,000,000
Accidents unaccompanied by injury	24,000,000
Loss of income to community	150,000,000
	$344,000,000

This amount, said Mr. Polakov, of course is an understatement, as many items of loss and expense are indeterminate, unrecorded or intangible. Likewise, destruction of coal deposits due to underground fires, loss of investment due to mine abandonment, flooding, bankruptcy, etc., are not taken into account, nor losses such as reduction of output, shattered morale, etc. Accepting Heinrich's estimates of the relation of indirect expense to compensation in place of the author's, Mr. Polakov said, this unnecessary financial loss equals $327,000,000 yearly, or over 50c. a ton, or 25c. if half the accidents are not preventable.

Hand-tool accidents have been decreasing rapidly, declared Mr. Polakov, whereas mechanical equipment accidents have been increasing just as rapidly. The speaker argued that the mine worker who uses hand tools is doing his bit for safety and the operator who provides the mechanical equipment is not. Bartley Murphy, safety director, H. C. Frick Coke Co., countered with the declaration that the contrast was due to the fact that the use of hand tools was decreasing and the use of mechanical equipment was making rapid strides. Miners are running the machines. Shall we say, said Mr. Murphy, that they are to blame for not reducing accidents by machinery. Roof-fall accidents have remained stationary. Who is to blame for that; surely, the miner.

Education for Miners

Education in safety has been confined largely in the past to persons aspiring to be mine foremen, assistant foremen or firebosses, declared E. E. Quenon, U. S. Bureau of Mines. Underground laborers have received relatively little consideration in such educational efforts. They have learned about safety largely by noting the conditions which injured them or their associates, supplemented by casual instruction from the foreman or some fellow worker, with some help also from first-aid and mine-rescue courses.

About four years ago the Bureau of Mines prepared a practical course for the bituminous coal worker, the undertaking being instituted only where sponsored by coal-mine officials and local unions. To qualify for a certificate, employees are expected to attend a two-hour lesson each week for a period of eight weeks. From July, 1940, to December, 1941, the course was conducted at six coal mines in western Pennsylvania. More than 3,000 mine workers attended one or more classes; 2,000 completed the course with an attend-

IMMEDIATE AND PERMANENT ANSWER

TO LOW COSTS WITH EFFICIENCY IN

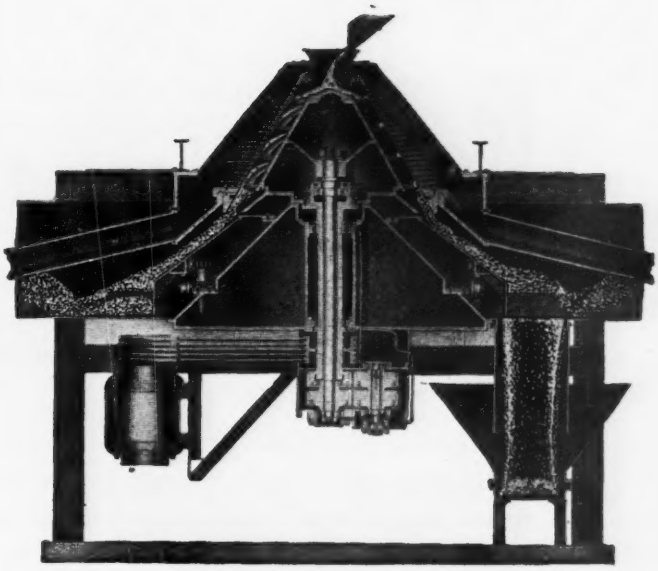
DEWATERING AND DRYING COAL

. . . Be fully prepared against coal freezing troubles . . .

Use the "C-M-I" Dryer and know that your coal will be delivered dry. No freezing in transit nor clogging of bins, spouts, and cars occurs. Thus, much time is saved in putting clean dry coal in your customers' bins or stock piles.

CONSERVES
MATERIALS
POWER · TIME

"C-M-I" Continuous Centrifugal DRYER



● Not only does the "C-M-I" Dryer produce coal that is dried to a non-freezing moisture content, but by its use many of the finer sizes now thrown away may be reclaimed.

Drying the finer sizes of your coal to a uniform moisture content speeds up deliveries, and now is the time to consider this efficient and profitable method of increasing your coal output.

CENTRIFUGAL AND MECHANICAL INDUSTRIES, INC.

SECOND AND PRESIDENT STREETS ST. LOUIS 18, MO.

PRODUCTION STEPS UP... WHEN YOU USE GENUINE FLEXIPIPE!

IN mines ventilated with *Genuine Flexipipe*, production that leads to war material is stepped up... because the men work better with *Flexipiped* fresh air and also because smoke and fumes are cleared away quicker after blasting, permitting the men to resume work sooner.

Genuine Flexipipe is made of tough, specially woven fabrics, specially treated to resist gases, heat, fungus growth, acid and mine waters. It's compact, lightweight, easy to handle, economical. Available in three grades, to meet varying requirements.

Genuine Flexipipe is easily and quickly repaired in case of damage... a mighty important point in these days when material must be conserved and production must be speeded.

Mail the coupon today for descriptive literature on *Genuine Flexipipe*.

Specify GENUINE FLEXIPIPE
THE ORIGINAL FLEXIBLE VENTILATING TUBING

BEMIS BRO. BAG CO., 412 Poplar Street, St. Louis 2, Missouri
Please send literature on *Genuine Flexipipe*

*Name*_____
*Company*_____
*Street*_____
*City*_____ *State*_____

ance of 55 employees in each class. An average of 53 percent of the employees on the company's payrolls completed the curriculum. Classes are scheduled from 10 to 12 noon and from 7 to 9 p. m. The men attend such classes as are most convenient to them and to their changing working shifts.

Since the introduction of shuttle cars, the tender roof over the Pittsburgh coal seam in Clarksburg, W. Va., has made necessary unusual and close timbering, according to G. R. Higginbotham, assistant to vice president, Consolidation Coal Co. The immediate roof consists of 4 to 24 in. of weak drawslate surmounted by a mud shale from zero to possibly 5 ft. in thickness, which latter absorbs moisture from the air rapidly and starts falling until hard rock is reached.

Room pillars were and still are blocks surrounded by rooms and crosscuts at 90-ft. centers. Crosscuts, rooms and central pillar splits are now made 14 ft. wide, have crossbars at 5-ft. centers and, wherever first cuts or lifts are made in the pillar, across the curving shuttle-car roads in room, crosscut or split are set radially in fan shape, two to six crossbars. Some of these crossbars have two posts at the exposed end and all the rest are supported by at least one post at each end. The radial bars erected to make first cuts feasible are at 5-ft. centers at their more divergent ends. Lifts are from 16 to 20 ft. wide.

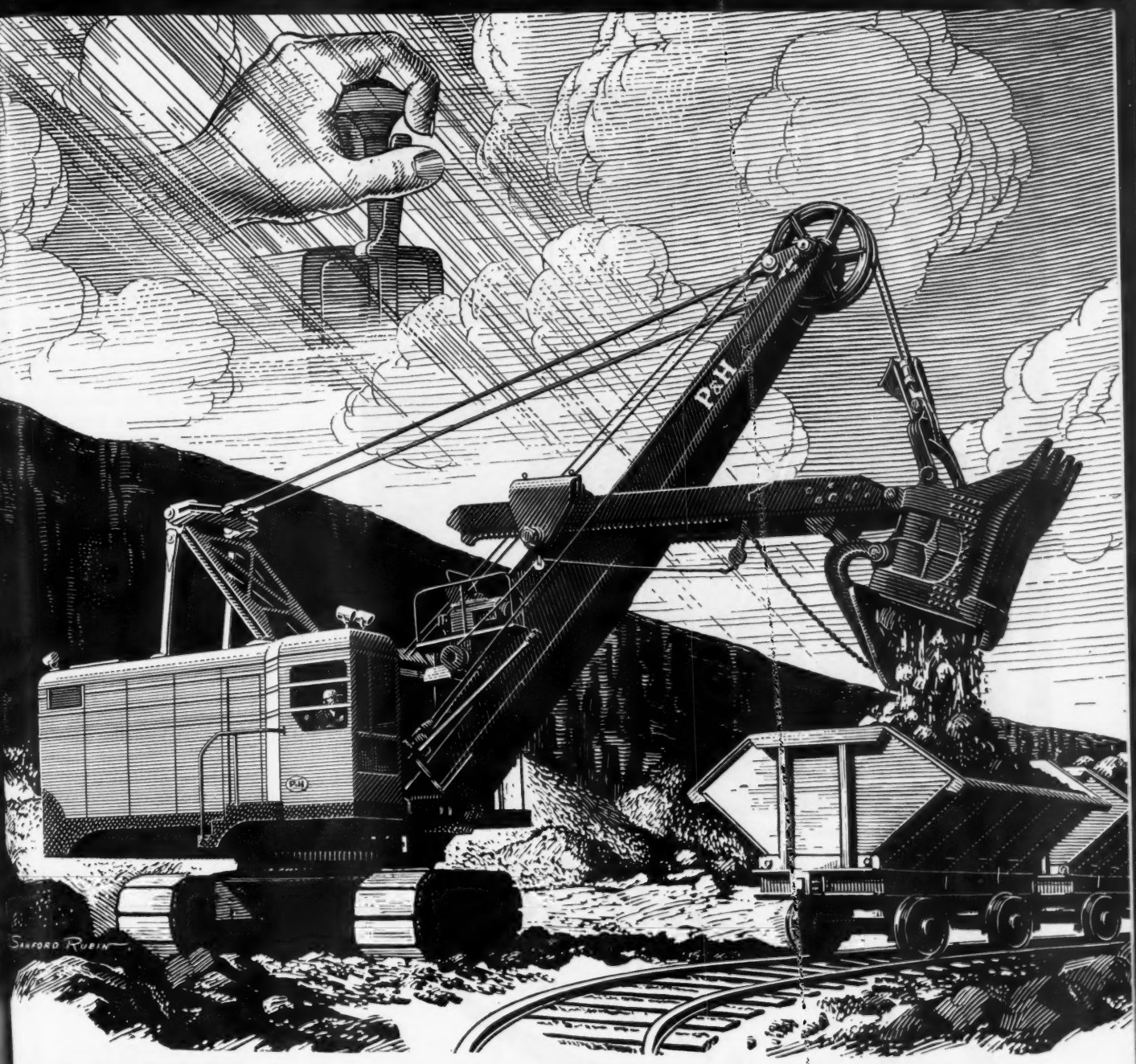
Miner Specialists

Time was, said O. A. Dingman, professor of mining engineering, Montana School of Mines, at the joint session of Coal Mining and Mining sections, when the metal-mine operator wanted all-around miners. Now he wants specialists—sinkers, driftmen and stopemen—so training is greatly simplified. The neophyte is given a 1½-hour pre-production instruction on top, and he is taken no farther if he is no longer disposed to seek a living in the mines. If he is still of the same mind as before, he goes into the mine with the other neophytes. Here the foreman meets them and breaks them up into groups and turns them over to a shift foreman who works with them in the stope, gradually giving them every kind of stope job.

They are paid $7.75 a shift. The company gets about $3.50 a day in product. After two weeks, the trainees are put on contract work. In three months they have a knowledge as complete as if they had worked a full year without such training. The company cannot afford to give the men any supplemental or related training.

Butte is interested in training both bosses and men, Duluth only in training bosses; in a mine he had visited in West Virginia the training was for miners only. The shift boss did the work first, and then the neophyte did it under his supervision. At Butte, 164 men were trained in June, 1942, in 30,900 shifts. Their average product was worth 60c. less than the regular men produced.

Today's demands upon labor and industry have demonstrated the importance



NEW! P&H DIRECTRON CONTROL

the simplest, smoothest, most efficient control ever applied to an electric shovel

America's open pit mines and quarries have long the need for better electric shovel control — for the plification of motor and motor generator design, d auxiliary control equipment with its complicated ys, resistors, and switchboard panels.

Through years of research and development—P&H perfected the revolutionary new Directron Control. pler, more direct, more dependable, this control comes maintenance problems and adds years to life of all electrical equipment. It also adds subtially to digging time.

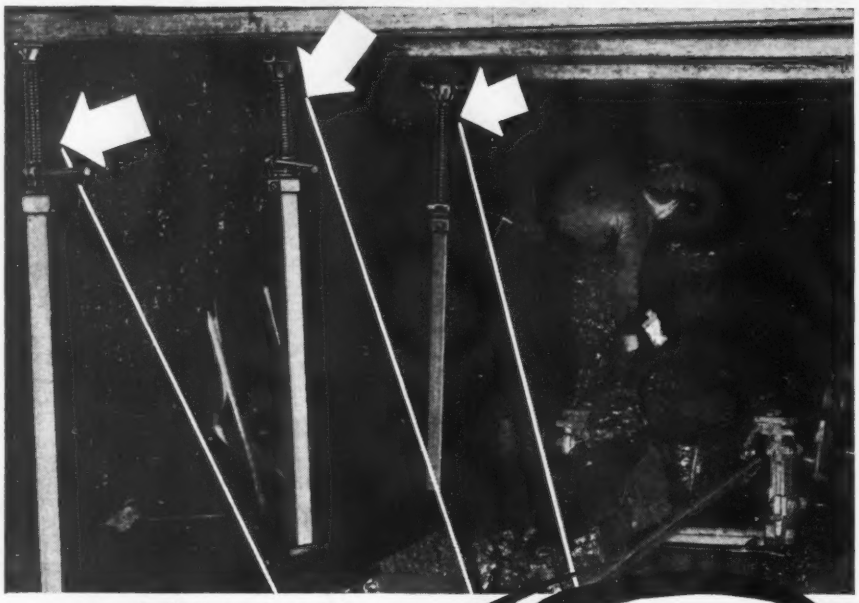
In addition, Directron Control provides the quick, ty response for steady production and levels out the power peaks to reduce power line charges to a minimum.

Another development in P&H's sixty-year experience of applying electrical power to the movement of heavy loads, it is but one of many outstanding advancements found in the new P&H Electric Shovels. Write for complete information.

P&H ELECTRIC SHOVELS
4540 W. NATIONAL AVE.
MILWAUKEE 14, WISCONSIN
HARNISCHFEGER CORPORATION
EXCAVATORS • ELECTRIC CRANES • ARC WELDERS • HOISTS • WELDING ELECTRODES • MOTORS

E GREATEST FORWARD STEP IN ELECTRIC SHOVEL DEVELOPMENT

DUFF-NORTON
MINING JACKS

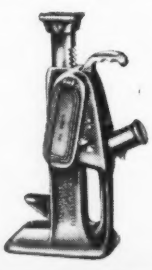


Duff-Norton Roof Jacks Promote Safety Underground

"MECHANICAL MUSCLES" ...A JACK FOR EVERY JOB!

The features you want in the Jacks you use are built into every Duff-Norton Jack—strength, simplicity, ease of operation, long life—the result of over 60 years' specialized experience in Jack design and manufacture.

For every job in and around the mine, there's a Duff-Norton Jack . . . ready to provide "mechanical muscles" on every job of lifting, holding, lowering, pushing and pulling. Write for Catalog 202.



THE DUFF-NORTON MANUFACTURING CO.

PITTSBURGH, PA.

Canadian Plant: Coaticook, Que. *Representatives in Principal Cities*

of adequate job and safety training, declared A. H. Zeilinger, safety engineer, Colorado Fuel & Iron Corp. Job instruction and safety instruction are inseparable and both should begin with an adequate induction service given the employee before he actually starts work. C. F. & I. has found that a four-step plan, involving preparation, presentation, performance and follow-up, is the most effective way of training new employees.

Every job should be broken down into its important steps and the key points should be stressed by the instructor. A key point is anything that will make or break the job, make the job safer, or make it easier. Safety always is a key point that the instructor emphasizes.

Besides instructing new employees, with special emphasis on safety, the foremen are advised to seek out job hazards and correct them in the most effective way. "There are three ways to deal with them," said Mr. Zeilinger. Remove them if possible; if that cannot be done, then guard them; and if that also is not possible, then show the worker how the job can be done with safety.

Rock Stresses Visualized

Studies made with vertical plates of plastic (plastacele) with scale perforations simulating tunnels and stopes (rooms) and placed under vertical stress have shown the mine managers in the Lake Shore mines, Kirkland Lake, Ont., Canada, without complicated and questionable mathematics, what are, and where are, the stresses which the rocks have to sustain. G. S. Jarrett, general safety engineer, International Nickel Co. of Canada, Ltd., Copper Cliffs, Ont., said that by polarizing rays of light and passing them through the plastic plate and then depolarizing them and viewing them on an intercepting screen the lines of stress can be plainly seen.

These pictures confirm the theory of a dome of stress surmounting the highly stressed area and also another theory that when an area of excessive stress exists it is not safe to approach a working in that area with another working. Much safer is it to drive a place from the over stressed area toward one that is more lightly stressed. Strangely, it is safer to start boldly in the endangered area and travel into safety than to start gingerly in the safety area and travel into the endangered area. The line of shear also could be noted on the silver screen. By advancing the perforations as if the tunnels and stopes were being driven, the whole cycle of stress can be depicted and the stresses in some degree evaluated. But, warned Mr. Jarrett, each mining property has its own characteristics.

Figures were presented showing that the investigations here detailed and others made at an earlier date have greatly lessened the number of rock bursts and the number of men injured thereby.

Significant also was an address by Lamar Weaver, superintendent of mines, Tennessee Copper Co., on the method of handling explosives at the company's mines. The workings have the same drawback as is so marked in anthracite

CLARKSON DIGS those Tight Corner Shots out PERFECTLY!

When undermining standing coal, the CLARKSON LOADER really proves its outstanding superiority on "tight corner shots". That's just one of its many exclusive features that appeals to coal mining engineers.

Added to this "corner shot" feature is the advantage of one operator handling all controls from one central point—the entire operation being powered with one (50 h. p.) Motor.

Yes, you'll find it well worth your time to get *all the facts* before you order *any* Loader.

The CLARKSON MANUFACTURING CO.
NASHVILLE, ILLINOIS

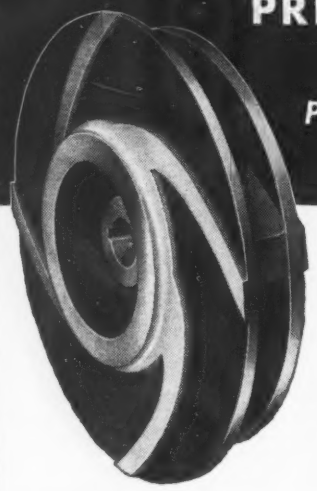
CLARKSON
UNIVERSAL 24BB
LOADER

LOWEST 50 H. P.
LOADER MADE
(PATENTED)

MORRIS

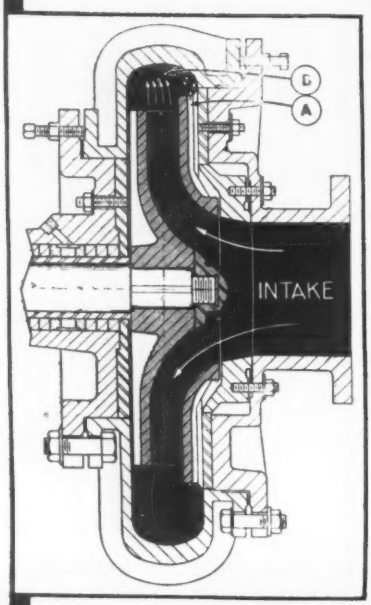
PRESSURE BALANCED IMPELLERS

Prolong Pump Life . . .
Increase Efficiency . . .



The hydraulic design of the Morris impeller reduces to a minimum destructive circulation of abrasive solids from the shell pressure passages to the suction inlet. Thus, the need for external water supply to prolong the life of the impeller and liners in this pump is entirely eliminated.

On the suction side of the impeller shroud MORRIS places additional vanes of larger diameter (A in the diagram). These produce a higher localized pressure than exists in the pump shell (indicated at B), reducing internal circulation and leakage. The resulting smoother positive flow directs abrasive and corrosive content away from the vital working parts and gives the impeller maximum wear protection.



This patented pressure balanced impeller is just one of the many points of hydraulic design in which MORRIS excels. Recommendations on slurry pumping problems based on over 75 years of pump building experience furnished upon request.

MORRIS MACHINE WORKS
Baldwinsville, N. Y.

Branch Offices in Principal Cities

Type S Slurry Pump

MORRIS CENTRIFUGAL PUMPS

workings, of mining a mineral that is a good conductor of electricity. Also, as in bituminous mines, the mineral dust is highly explosive. The ore contains 95 percent of sulphides of iron, copper and zinc. As a result stray currents occasion much trouble.

Once each week the detonators for shooting are loaded into light wood boxes 21 in. wide, 24 in. long and 11 in. deep and hauled into the mines. Each box holds 500 detonators. These boxes have separate sections for each delay. Any unused detonators are brought back to the surface magazines where the leg-wire insulation is dried. After a week or more of such treatment, these detonators are reissued.

On reaching the underground magazine, the detonators are stored in the wood boxes already described until they are issued by a licensed powderman to the miners, who are furnished with covered wood boxes having a capacity of 50 detonators. Some detonators are issued also to loaders who fire block holes throughout the shift. The miners are required to wait until they have completed their drilling for the day and know exactly how many detonators and how much dynamite they will need. In all cases, the unused explosives are checked back to the magazine tender at the close of the shift, except such dynamite as is sold to contractors in case lots, who keep the unused dynamite in a standard wood magazine under their own lock.

In the underground magazine, detonators are stored behind a door in a recess in the opposite side of a 4-ft. passageway from that in which is recessed the dynamite magazine. This room is 25 ft. in the clear away from the detonator storage. The detonator magazine above ground is a two-room brick building with concrete floor and concrete foundation and 12-in. brick walls with a wood ceiling and an aluminum-painted corrugated-iron roof. One room, 6x26 ft., is used for storage of 250,000 detonators or less; the other, 14 x 20 ft., separated by a 12-in. brick wall, is the "preparation room."

•

New Producers And Reopenings Planned

Construction of a new tipple at the Powhatan mine, Powhatan, Ala., has been completed by the Franklin Coal Mining Co. to replace the one recently destroyed by fire. Coal production has been resumed, but will be limited to mine-run until a new preparation plant has been completed, according to R. T. Daniel, president.

Sloss Sheffield Steel & Iron Co. is dewatering the old Kimberly mine, in northern Jefferson County, Alabama, formerly operated by the Central Alabama Coal Co., but idle since it was flooded about 15 years ago. Situated on the Louisville & Nashville R.R., it is to have a capacity of about 600 tons per day when production is resumed in the near future.

With construction of a new L.& N. spur between Central City and Madisonville, Ky., well on its way, the Crescent Coal Co. is developing a slope mine and pour-

HOW A B G CONVEYOR SIMPLIFIES MINE HAULAGE . . .

HERE'S why standardized Barber-Greene sectional conveyor equipment is ideally suited to wide application in your mine:

It is factory-engineered and prefabricated in unit sections and terminals.

It can be moved and reassembled with little labor expense, or loss of time.

It utilizes the advantages and economy of continuous flow transportation.

Conveyor frame sections withstand severe abuse.

Conveyors will conform to reasonable bottom curves.

Frames and terminal units are interchangeable.

Three styles of sections—angle, channel and truss—offer the correct overall height to meet the working condition.

For fast and low-cost transportation from working face to surface, install a Barber-Greene conveyor system. B-G engineers and mine consultants, experienced in mine conveyor operations, are available. Barber-Greene Company, Aurora, Illinois.

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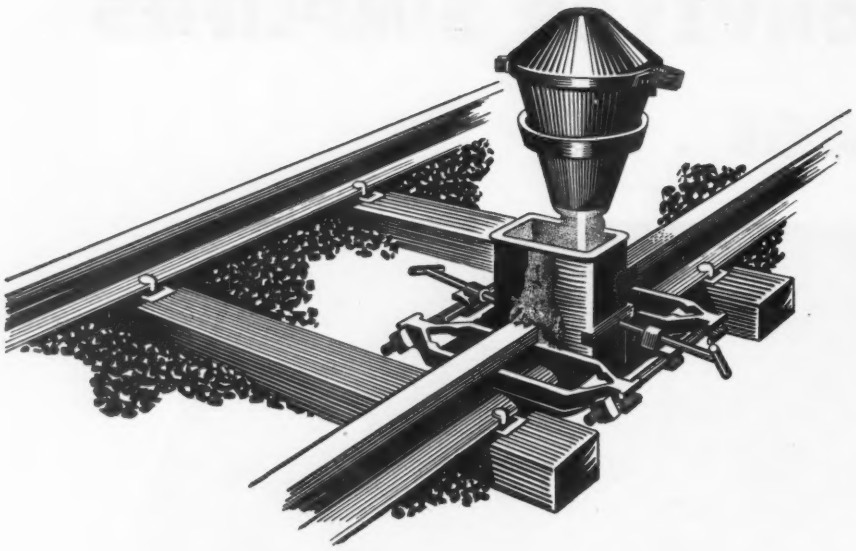
BARBER GREENE

AURORA, ILL., U. S. A.



THIS MODERNIZATION JOB...

Doesn't have to wait

There's one modernization job that doesn't have to rest on the shelf for the duration. It's Thermit welding the rail joints of your main haulage track.

Once Thermit welding converts jointed track into long, smooth-running stretches, cars travel safer at higher speeds over rail that stays straight as a die. Power losses at the joints are abolished. There's less wear and tear on rails and rolling stock. Track maintenance costs shrink close to 45%.

Another feature of Thermit welding is that it provides a dependable maintenance tool when breakdowns occur in heavy-duty equipment. For it restores broken axles, crankshafts and similar high-tonnage parts to full operation with savings in labor, time and costs.

For further details, send for your copy of "Continuous Rail for Main Haulage Track."

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ALBANY • CHICAGO • PITTSBURGH • SO. SAN FRANCISCO • TORONTO

Specialists in welding for nearly forty years. Manufacturers of Murex Electrodes for arc welding and of Thermit for rail welding.

ing concrete for a new tipple that will be able to handle about 60 cars of coal daily, operating in the No. 11 seam. Equipment will include a washer. Justin Potter, president, Nashville Coal Co., also is president of Crescent.

The first trainload of coal from the new operation of the Powell Coal Co. on Rockhouse Creek, Logan County, West Virginia, was shipped Oct. 3 over a 4½-mile spur of the Chesapeake & Ohio Ry. completed three days previous. The coal is being mined with complete mechanical equipment from a tract of about 9,000 acres acquired from the McDonald interests several months ago. President J. D. Francis, also president of the Island Creek Coal Co., estimated that the new plant, having a six-track tipple, would be a source of supply for "40 or 50 years."

A new mine is to be opened soon by the West Kentucky Coal Co. two miles east of Madisonville, Ky., according to Hooper Love, president. It will be situated in a 6,000-acre coal tract and will have a daily output of 4,000 tons of washed coal. It is to be a slope operation, with the latest mechanical equipment, including belt haulage. When full production is reached the plant will employ 300 men.

Rustein Coal Co. has opened a strip mine on the Illinois Central R.R. five miles east of Madisonville, Ky. About 50 cars are being loaded and shipped daily. Stripping is being done under contract with the Badgett Construction Co., Memphis, Tenn. Loading is by contract with Chandler Brothers of Virginia.

Bryan Whitfield Jr., of the Harlan (Ky.) Collieries Co., and Charles Guthrie, of the Harlan Fuel Co., Harlan, Ky., announce the purchase of the Gibson Fuel Co., Blackwood, Va., having operations at Calvin and Pardee, Va., among the largest is the Wise County field. Mr. Whitfield has been named president of the new company; Mr. Guthrie, vice president; and John McKinley, secretary-treasurer.

•

Preparation Facilities

Feds Creek Coal Co., Inc., Harman, Va.—Contract closed with Roberts & Schaefer Co. for complete steel tipple to be built near Nigh, Pike County, Ky., consisting of car feeder, rotary dump, coal and refuse bin, retarding conveyors, Marcus tipple and loading booms; capacity, 500 t.p.h. preparing lump, egg and slack, and later also pea; to be completed April 1, 1945.

Gay Coal & Coke Co., Mt. Gay, W. Va.—Contract closed with Roberts & Schaefer Co. for Stump Air-Flow cleaning plant to prepare 0x¾-in. slack; capacity, 40 t.p.h.; to be in operation Dec. 1.

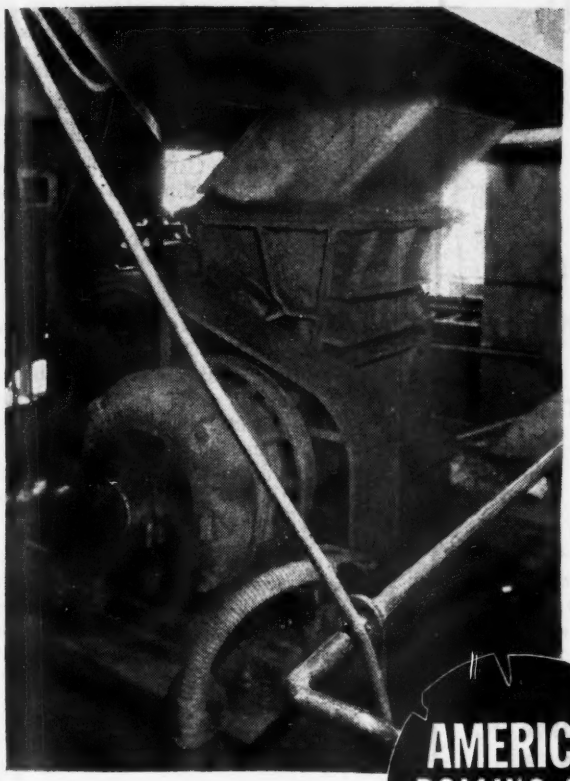
Jeddo-Highland Coal Co., Jeddo, Pa. —Contract closed with Wilmot Engineering Co. for three Type E Wilmot Simplex Jigs to prepare steamboat, broken, egg and stove coals; total feed capacity, 225 t.p.h.

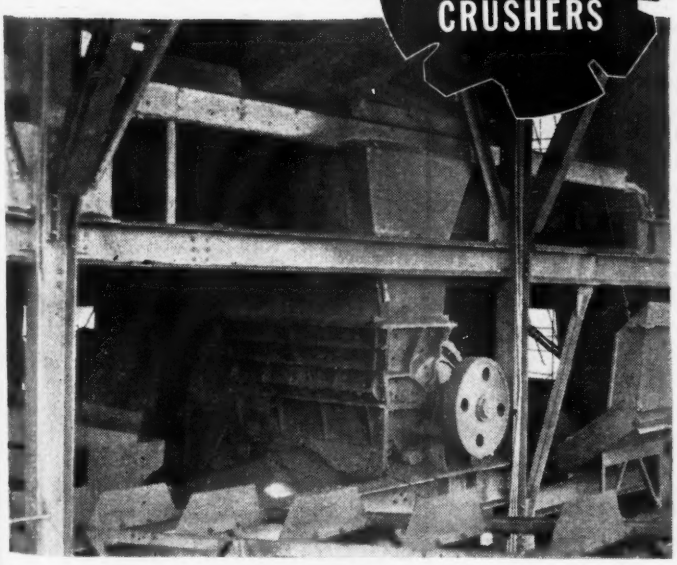
Lehigh Navigation Coal Co., Lansford, Pa.—Contract closed with Wilmot Engineering Co. for two 5-ft.-diameter Wilmot Hydrotators to prepare barley coal; total clean-coal capacity, 50 t.p.h.

South Tamaqua Coal Pockets, South

GET THIS *Proved*

HIGH TONNAGE PER HOUR CRUSHING





AMERICAN ROLLING RING CRUSHERS

EXAMPLES OF PERFORMANCE

One operator stepped up production with a 60-S Crusher from normal 300 tons per hour to between 350 and 400 tons per hour, producing a 4″x0 product.

An AC Type is used for reducing 150 T. P. H. nut coal to a product passing a 1″ round opening screen.

A 30-S Crusher is in service of a large operator reducing 100 tons per hour, 18″ lump coal to 1½″ and under product.

We have one record of an American Crusher having crushed 2,573,836 tons in 13 years without one cent maintenance cost.

MAINTENANCE

It has been proved over years in such services as above that American Rolling Ring Crushers operate at less than one cent a ton including all costs to reduce bituminous coal from lump to stoker size. This indicates that maintenance costs are exceptionally low.

SOME OF THE BENEFITS

You get greater range of reduction—you get uniformity of sizes—you have accessibility at all times—you have a crushing unit of extreme flexibility—you have high tonnage results with high safety factor—you have a unit that is simple in construction, yet durable and that is easy to operate.

The splitting action of the SHREDDER RINGS shatters and distributes the coal before it reaches the Breaker and Grinding Plates.

These patented reversible manganese steel SHREDDER RINGS are found only in the American Rolling Ring Crusher. They have twenty cutting edges or teeth and are designed to maintain their outward position by centrifugal force at the specified speeds. In contact with solid metal, the rings are momentarily deflected from their usual course because they are free to swing back out of position. There are no shear pins or other safety devices that require attention.

(PATENTED)

AMERICAN PULVERIZER COMPANY
1119 MACKLIND AVENUE
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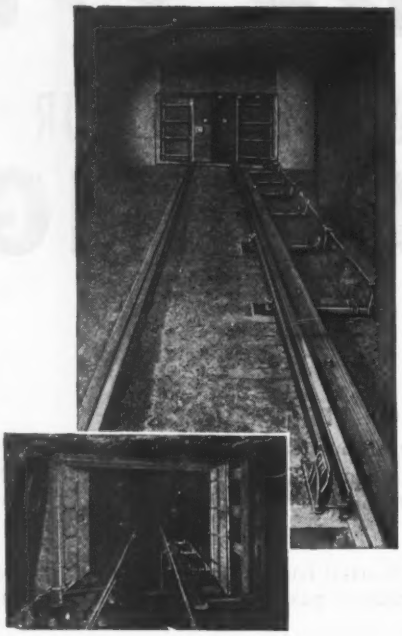
ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS

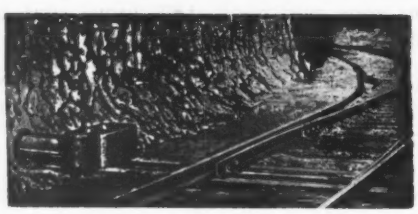
SAVES LIVES, TIME and MONEY
Speed the Haulage Safely with



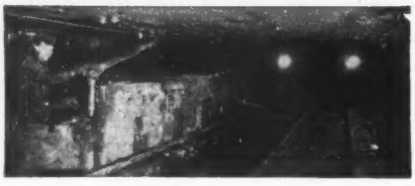
ECONOMICAL
AUTOMATIC
DEVICES . . .

Reduce Costs,
Increase Tonnage!

THE AMERICAN AUTOMATIC DOOR . . . requires no attendant—opens automatically in a split second and closes same way when last car has passed—no slowing down on approach—thus trips are speeded up. Mechanical action is fast and positive. Air flow is maintained at constant speed to carry off accumulated gas.



THE CANTON AUTOMATIC SWITCH THROWER . . . does everything a switchman can do and does it faster with safety. Automatically throws switch points ahead or behind trip—or both. Trip maintains full speed. Switch can be operated by motorman, remote control or by hand and is adapted for use with automatic DERAILER.



SIGNALS . . . warn interfering trips and clear the way for non-stop main line trips. Prevent collisions and enable all trips to move with safety and speed.

These automatic devices make for perfect coordination of loading, transportation and tipple by eliminating lost time and speeding trips efficiently and safely. Our sales engineers will be glad to inspect and recommend installations that will save man hours, improve *safety*—no obligations. Canton devices pay for themselves—quickly. Complete catalogues on request.

AMERICAN MINE DOOR CO.
2057 DEUBER AVE., CANTON 6, OHIO

Tamaqua, Pa.—Contract closed with Wilmot Engineering Co. for one Type D Wilmot Simplex jig to prepare nut coal; feed capacity, 20 t.p.h.

North Side Coal Co., Belleville, Ind.—Contract closed with Deister Concentrator Co. for one SuperDuty diagonal-deck washing table to treat 0x1¼-in. coal.

Red Jacket Coal Corp., Mitchell Branch Mine, Red Jacket, W. Va.—Contract closed with Morrow Mfg. Co. for feeders, conveyors, screens, loading booms, Baum jig (Simon-Carves), vibrating dewatering screens, settling tank, etc.; capacity of tipple, 350 t.p.h. of mine-run coal; maximum capacity of cleaning plants, 300 t.p.h. of 5x¼-in. coal; to be completed about April 1, 1945.

Lillybrook Coal Co., Big Stick Mine No. 2, Abney, W. Va.—Contract closed with Kanawha Mfg. Co. for four-track tipple complete with cross-over dump, mine-run conveyor, shaker screens, three loading booms, reassembling conveyor, Kanawha-Belknap washer for 3x⅜-in. coal, capacity 50 t.p.h.; sizing screen and refuse conveyor; tipple capacity, 125 t.p.h.

Panther Coal Co., Roseann, Va.—Contract closed with Kanawha Mfg. Co. for Kanawha-Belknap washing plant consisting of three washers together with the necessary fine-coal screens and reassembling conveyors; egg washer, 40 t.p.h.; stove washer, 40 t.p.h.; nut washer, 60 t.p.h.

•

To Name Three Ships For Anthracite Towns

Wartime production achievements in the Pennsylvania anthracite mines are to be recognized by naming three Victory ships after towns in the mining region—one for each of the United Mine Workers of America Districts, Nos. 1, 7 and 9. Proposed by the Solid Fuel Administration for War, with cooperation of the U. S. Maritime Commission and indorsement of the U.M.W., the plan provides that a name shall be selected for each vessel through an essay contest open to sons and daughters and brothers and sisters of U.M.W. members enrolled in grades 9 through 12 in public and parochial schools of the anthracite region.

The winning girl contestant in each district shall be designated as sponsor of the district's vessel and the winning boy contestant as her escort. Each U.M.W. district union shall appoint an adult companion for its winning couple, probably the wife of a mine worker. There is to be a colorful triple launching ceremony at Baltimore, Md., in January, in which the student winners and their adult companions will take part, with all transportation and other expenses paid by U.M.W. district unions.

Names for the Victory ships are to be chosen from hard-coal communities with post office designations but not already given to ships afloat. The decisions were to be based on essays each about 200 words long submitted to the Wilkes-Barre SFAW office by Nov. 16.

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CLEVELAND (14), 1534 E. 39th St.,
Teletype CV. 153 HEnderson 5750

MILWAUKEE (1), 4027 West Scott St., P. O. Box 2045
Teletype MI. 587 Mitchell 7500

NEWARK (1), N. J., Foot of Bessemer St., P. O. Box 479
Teletype NK. 74 Bigelow 3-5920
REctor 2-6560 - BErgen 3-1614

PITTSBURGH (12), 1281 Reedsdale St., N. S.
Teletype PG. 475 CEdar 7780

ST. LOUIS (3), 21st & Gratiot Sts., P. O. Box 27
Teletype SL. 384 MAin 5235

TWIN CITY, 2545 University Ave., St. Paul (4), Minn.
Teletype STP. 154 NEstor 2821

OUR definite progress towards victory has been made possible by all hands working together and delivering materials to our fighting men. For the bravest men in the world can't fight without weapons and supplies.

Perhaps you need help in turning out war goods—steel, steel products, tools and machinery; if so, get in touch with our nearest warehouse. We have nine of them, located in the big production centers and our men will break their backs to get goods to you in a hurry.

We have large stocks, even today, including the National Emergency Alloy Steels which have proved so successful. Try us—we have helped speed many a war order. Your call will receive quick action. Write, wire or phone our nearest warehouse.

NEED WELDING MATERIALS?

We can supply Welding Wire, for electric arc welding, such as:

STAINLESS STEEL ELECTRODES
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We also offer Welding Machines, Protect-O-Metal for elimination of weld spatter and Havens "C" Protected Clamps. Write, phone or wire our nearest warehouse.

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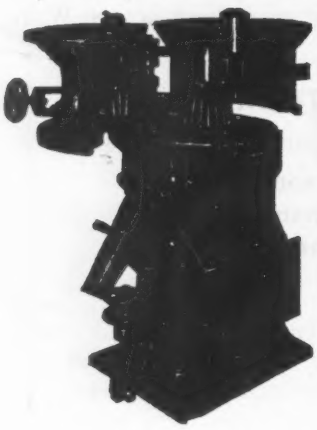
UNITED STATES STEEL

IT USED TO TAKE 32 OPERATIONS

TO GET THIS SAMPLE!



BUT NOW YOU CAN CRUSH AND SAMPLE

1 TON IN 1 HOUR

WITH THE

STURTEVANT

Automatic

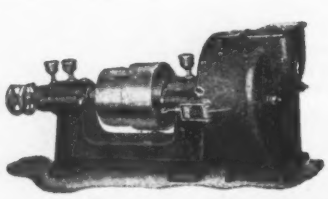
CRUSHER *and* SAMPLER

Times change! It used to be ok to have one or two men devote hours to "sampling" a pile of coal. But today you can get BETTER results — FASTER — delivered to your laboratory by the Sturtevant Equipment shown here. This is MODERN equipment. It meets the modern demand for a better quality coal to meet the increasingly SPECIFIC requirements of modern plants. The FIRST STEP in laboratory-control of coal QUALITY is to get accurate samples quickly and at low cost. This the Sturtevant Coal Crusher and Sampler does without hand labor. Proven by the test of actual service in modern collieries. Can be depended upon as reliable equipment. Simple, rugged, easily adjusted and maintained—and ACCURATE. The ideal combination with this Sampler is the STURTEVANT FINE GRINDER.

HERE IS THE IDEAL COMBINATION TO SPEED LABORATORY CONTROL AND INSURE RESULTS !

STURTEVANT SAMPLE GRINDER

The Sample Grinder is of the "open-door" disc design, producing products as fine as 100 mesh (coarser, if desired) working on dry, friable, soft or moderately hard materials. Handwheel regulates output from 10 to 100 mesh. Will handle hard rock and ore at reduced capacities. Full description and price on request.



Write today for Bulletin illustrating and describing the above equipment in detail. Sturtevant Mill Co. makes a wide line of Grinding, Separating, Elevating, Conveying and Mixing Machines. Write for pocket-size Bulletin covering the whole series.

STURTEVANT MILL CO.

14 HARRISON SQUARE

BOSTON 22, MASS.

25-Yd. Dragline Makes Its Bow

Between 500 and 600 persons, representing the press and coal and allied industries, on Oct. 18 and 19 witnessed the first public demonstration of the new 25-cu.yd. electric walking dragline built by the Bucyrus-Erie Co., South Milwaukee, Wis., for the Correale Construction Co., operating the Beechwood stripping project near Minersville, Schuylkill County, Pa., for the Philadelphia & Reading Coal & Iron Co.

The dragline, said by Bucyrus-Erie to be the largest in the world, has a 180-ft. boom, weighs 1,400 tons and was brought to Minersville in 52 freight cars. It took six months to build and five months to assemble. The 25-yd. bucket is of steel construction with manganese steel lip and teeth.

Operating in the Mammoth seam, the dragline will eventually be working in overburden up to a depth of 380 ft. The coal in the seam runs from 40 ft. to 120 ft. in thickness. Power for the dragline is 3-phase, 60 cycle, 4,000 volts, which drives Westinghouse motors developing 1,750 hp. The dragline has a capacity of 20,000 cu.yd. of earth a day, and at present is working three shifts.

The public inspection was arranged by R. J. Breslin, anthracite district sales manager for Bucyrus-Erie.

•

South-East Team First-Aid Winner

South-East Coal Co. team took first place in the first-aid tests at both the safety day contest of the Big Sandy-Elkhorn Coal Mining Institute, Oct. 7 at Pikeville, Ky., and the State-wide contest, Oct. 14 at Lexington, Ky. At the first-named meet, second place went to the Consolidation Coal Co.'s No. 204 team and third to another Consol group. The order of finish in the mine-rescue contest at Pikeville was: (1) Consolidation No. 207, (2) Inland Steel team, (3) Consolidation No. 214. Consolidation teams also led in colored and boys' first-aid tests. Kentucky & West Virginia Power Co.'s group led the girls' first-aid teams at both meets. Second and third places in the State-wide first-aid contest went to the Utilities Elkhorn Coal Co. and Consolidation No. 207.

Inland Steel Co. won the tests for both Boy Scouts and colored men at Lexington.

•

Roads Authorized To Build Branches

Chesapeake & Ohio Ry. has been authorized by the Interstate Commerce Commission to extend its line from a point near the confluence of Little Ugly Branch and West Fork of Pond Fork of Little Coal River in Boone County, West Virginia, a distance of about two miles southeasterly to a point near the mouth of James Creek. The proposed extension will serve an area containing about 55,000,000 tons of high-volatile splint coal. The applicant esti-

will his eyes be on the job tomorrow?

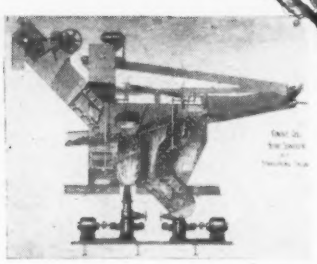
YES—if he's wearing AO Safety Goggles!

AO Safety Goggles provide protection against eye hazards... remove the danger of lost-time eye injuries. The man working *unprotected* takes the risk. And it's usually a costly day for him—and for you—when an eye accident injures his sight.

How many of your workers are taking such risks? An AO Safety Engineer can point them out by making an eye hazard survey of your plant. He'll also recommend the proper goggles for each type of job. Call in a M.S.A. man this week—and help keep your "production eyes" *producing.*

American Optical
COMPANY
SOUTHBRIDGE, MASSACHUSETTS

PRODUCE *Better Coal* AT LOWER COST... WITH R and S MODERN EQUIPMENT

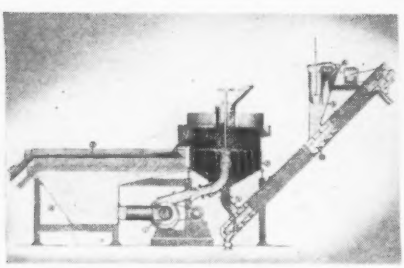


For all coarse coal washing

HYDRO-SEPARATOR

IMPROVED LAUNDER TYPE

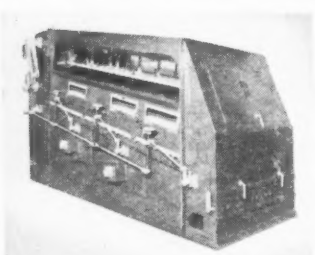
A product of painstaking engineering and long, intimate knowledge of production problems, the Hydro-Separator is known wherever coal is mined, as an exceptionally well built, efficient unit.



For low cost washing of fine coal...

The HYDROTATOR

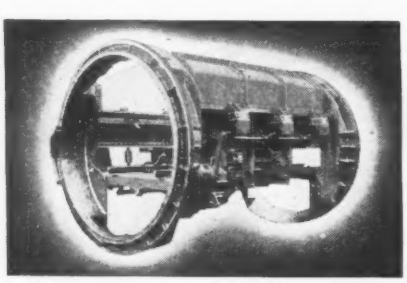
This is the effective way to wash fine coal and get increased recovery of marketable coal from sludge and refuse. Low cost efficiency is built into the Hydrotator.



For dry cleaning fine coal

STUMP AIR-FLOW

Experienced operators *know* Stump Air-Flow—know it for its simplicity and dependability, for its sturdy construction. It cleans, dries, dedusts in one operation.



Handles any size and type of car

ROTARY CAR DUMPER

Faster dumping, easy handling, unique safety features, reduced labor cost and minimum degradation—these advantages make the R and S Car Dumper the outstanding leader, Electric and Pneumatic types.

Bulletins describing these well designed, dependable units are modern "must" literature. Sending for them is a wise step—no obligation, of course. Simply refer to the product name.

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307 North Michigan Avenue, Chicago

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mated that 200,000 tons would be handled the first year and the volume would increase to 800,000 tons the fourth year, the latter rate lasting thereafter for 50 years or more.

An I.C.C. examiner recommends authorization of construction by the Chicago, St. Louis & New Orleans R.R. and the Louisville & Nashville and operation by the L. & N. and the Illinois Central of a joint line in Muhlenberg County, Kentucky, that would serve mines of the Kirk Coal Mining Co. and the Wickliffe Coal Co., as suggested by the Illinois Central.

Louisville & Nashville R.R. has been authorized to construct a 2.88 branch line near Millport, Ky., estimated to cost $153,516. The line will open up a 5,000-acre coal field that will produce more than 700,000 tons of coal a year, L. & N. officials said.

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May Seek Permits To Produce Stokers

Stoker manufacturers were notified Oct. 7 by the War Production Board that they might apply for permission to produce the 37,500 domestic type stokers for which material was authorized recently. Order L-75 (Coal Stokers) was amended to provide that any manufacturer who wishes to produce coal stokers must apply for authorization by letter to the nearest WPB field office.

No control over distribution of coal stokers will be maintained by WPB. However, each manufacturer will be expected to distribute his production through his normal distribution channels, taking into consideration shipments to areas during 1941, immigration of workers to certain areas, and such other factors as will provide equitable distribution to meet essential needs, officials said. WPB also reserves the right to direct the distribution of specified quantities from any manufacturer's production to meet emergencies.

Actual installation of coal stokers is controlled by WPB under its construction order, L-41, which permits installation of stokers without WPB approval, however, if the installation results in a saving of coal and if coal formerly was used as a fuel. Installation cannot cost over $5,000 and the total cost of the job including cost of the equipment must not exceed $25,000. New installations of coal stokers which necessitate a change in fuel still require WPB approval, however.

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Obituary

DAVID H. ATWATER, president, William C. Atwater Co., and vice president, American Coal Co. of Allegany County, with operations in the Pocahontas field of West Virginia, died suddenly Sept. 24 at his home at Providence, R. I.

COL. WILLIAM DAVIDSON ORD, 77, identified for more than 33 years with the Empire Coal & Coke Co. and the Elkhorn Valley Coal Land Co., of both of which he was president, and vice president of the Red Jacket Coal Corp., all in West Virginia, at the time of his retirement

BOWDIL COAL CUTTING EQUIPMENT

Watch your costs come down!

SAVE TIME... SAVE POWER... SPEED CUTTING OPERATIONS

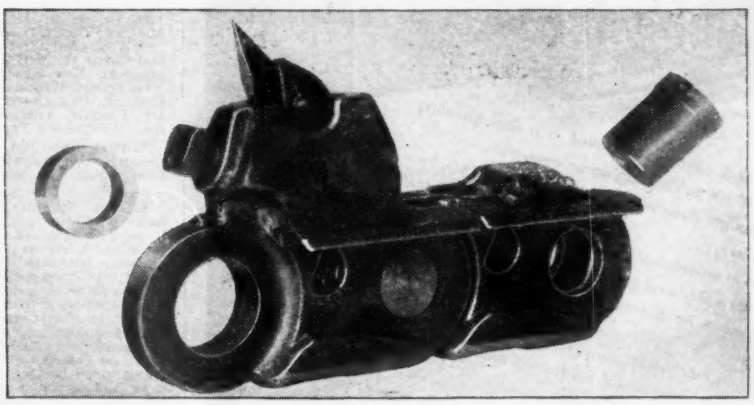
with the

BOWDIL BIT *and* CHAIN!

Get 25% to 30% more coarse cuttings *now* by specifying the BOWDIL Bit and Chain. You'll get this advantage because the thin, concave design of BOWDIL Cutter Bits greatly increases clearance . . . permits wearing BOWDIL Bits down 25% farther than is possible or practical with standard types, *without* increasing power requirements or dust.

The great strength and rigidity of the Chain further reduces power demand, and results in 20% longer service life. Note that the couplings have been designed for quick, easy removal and replacement, thus saving man-hours and maintenance time.

Let the BOWDIL Combination—Bar, Bit and Chain—save time and money for you. Write . . . we'll send information on all three immediately.



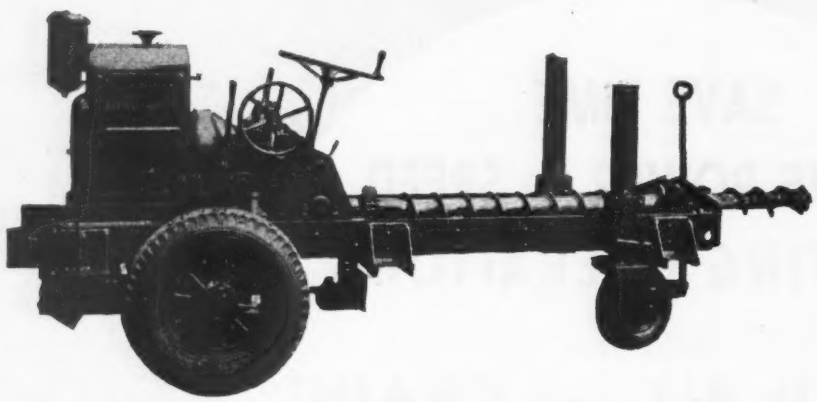
ASK THE BOWDIL SALES ENGINEER TO SHOW YOU COST-CUTTING EXAMPLES

THE BOWDIL COMPANY • CANTON • OHIO

PARMANCO Horizontal Drills

"Positive Control Drilling"

Parmanco Horizontal Drills give you "Positive Control Drilling." Parmanco Vertical and Horizontal Drills are today's leaders in low cost, low maintenance drilling—All Parmanco Drills are equipped with patented Parmanco augers. Used by leading strip mine operators—Write us your drilling problems.



PARIS MANUFACTURING CO.

PARIS, ILLINOIS

This
DE LAVAL
WORM GEAR of 32½ ratio was installed in a coal handling plant in 1928 to transmit 40 h.p. to drive an apron conveyor.

Recently the owners bought three more De Laval worm gears, two of them for conveyor drives.

Continuous operation in an atmosphere laden with abrasive dust or moisture has no terrors for a De Laval gear, which is self-contained and self-lubricating and requires no attention further than an occasional checking of the oil level.

Process plants find in mechanical conveyors with De Laval worm gear drives a superior and economical means for moving materials steadily in large quantities over long distances.

Our engineers will be glad to study your requirements and to assist with data and layouts. Ask for Publication W-1133

DE LAVAL WORM GEAR DIVISION
of the De Laval Steam Turbine Co., Trenton, N. J.

some years ago, died Oct. 8 at his home at Alexandria, Va. Prominent in the Pocahontas field of West Virginia for many years, he was for twelve years chairman of the executive committee of the Pocahontas Operators' Association, helped found the National Coal Association, and was its treasurer at the time of his death.

•

Compensation Given Miner for Asthma

An award of $3,600 was returned by Compensation Referee David W. Phillips in the claim of Joseph Mesite, Carbondale, Pa., against the DeAngelis Coal Co. for compensation on account of asthma.

•

Gulf Tipple Burns

A 1,600-ton tipple of the Gulf Smokeless Coal Co. at Tams, W. Va., was destroyed by fire Sept. 26 at a loss estimated by President W. T. Tams at $200,000.

•

Association Activities

KANAWHA COAL OPERATORS' ASSOCIATION elected Frank Hornickel as president at its annual meeting. D. W. Martin was named vice president; Harry G. Kennedy

LEGAL NOTICE

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933

Of Coal Age, published Monthly at Albany, New York, for October 1, 1944.

State of New York } ss.
County of New York }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared **Joseph A. Gerardi**, who, having been duly sworn according to law, deposes and says that he is the Secretary of the McGraw-Hill Publishing Company, Inc., publishers of **Coal Age**, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, to wit:

1. That the name and address of the publisher, editor, managing editor, and business managers is: Publisher, McGraw-Hill Publishing Company, Inc.; Editor, Ivan A. Given; Managing Editor, None. Business Manager, Alfred M. Staehle; all of 330 West 42nd St., New York City 18.

2. That the owner is: McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York City. Stockholders holding 1% or more of stock: James H. McGraw; James H. McGraw, Jr.; James H. McGraw, Jr., Curtis W. McGraw and Edwin S. Wilsey, Trustees for: H. W. McGraw, J. H. McGraw, Jr., D. C. McGraw, C. W. McGraw; Curtis W. McGraw, Donald C. McGraw; all of 330 West 42nd Street, New York City; Edwin S. Wilsey and Curtis W. McGraw, Trustees for J. H. McGraw, 3rd, Madison, New Jersey; Mildred W. McGraw, Madison, New Jersey; Wilson C. Laucks, Spruce and Canal Sts., Reading, Pa.; Grace W. Mehren, 73 No. Country Club Dr., Phoenix, Ariz.; Margaret Stump, 1418 Rose Virginia Rd., Wyomissing Park, Reading, Pa.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

J. A. GERARDI, Secretary.

McGRAW-HILL PUBLISHING COMPANY, INC.

Sworn to and subscribed before me this 28th day of September, 1944.

[SEAL] ELVA G. MASLIN.

(My commission expires March 30, 1946.)

THERE'S A BETTER WAY TO FIGHT FROZEN COAL...

FREEZEPROOF WITH CALCIUM CHLORIDE

Getting frozen coal out of the car is a headache for both railroad men and coal dealers. Bumping the cars is one customary way to loosen the coal, but—big, frozen chunks remain difficult to unload.

Prevent damage to cars, reduction in coal grades, demurrage and attendant troubles by mine treatment with calcium chloride to prevent freezing.

Remember, too, that adequate freezeproofing also provides the clean, odorless, dust treatment that householders have come to expect.

Bulletin No. 37 explains calcium chloride treatment. Let us send you a copy. Calcium Chloride Association, 4145 Penobscot Building, Detroit 26, Michigan.

FREEZEPROOF COAL AT THE MINES WITH

CALCIUM CHLORIDE

THE PROOF IS IN THE USING

Specializing in Bronze Bearings and Bushings

for coal mining equipment, we give you a money-back guarantee of superior service.

Promet assures you a specific formulae designed to best serve each application.

PROMET BAR STOCK

(cored or solid) machines easily. Rounds, hexagons and squares, in rough cast, semi-finished, or fully machined. Cored bar stock in all sizes (by 1/8" steps) from a 1/2" minimum core to 12" O.D. and 12" lengths.

Write for free booklet.

Parts for Jeffrey, Goodman, Westinghouse, General Electric, Sullivan, Joy Equipment, etc.

PROMET THE Engineered BRONZE

THE AMERICAN CRUCIBLE PRODUCTS CO.
1307 Oberlin Ave., Lorain, Ohio, U. S. A.

Prompt deliveries can usually be made from stocks maintained at

BECKLEY, W. Va., The Universal Supply Co., Corner 2nd Ave. and 2nd St. — Phone 3612
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Other Representatives

ALTON, ILL., Frank I. Rhine, 623 Blair Ave. — Phone Alton 3-8634
BIG STONE GAP, VIRGINIA — C. P. Cawood
BIRMINGHAM 1, ALA., O. D. Pedstrom Equipment Co. — P. O. Box 103
CANTON, OHIO, Bondil Complex, Waynesburg Road — Phone 29-404
MT. LEBANON, PA., J. F. Nieser, 720 Roseland Ave. — Phone LE 9876
DENVER, COLO., Urquhart Service, 16th Street at Blake — Phone Main 6231

P-G *Automatic* TRANSFER SWITCH

PROMOTES *Safety* AND INCREASES PRODUCTION

Eliminates hand switches—entirely automatic. No shocks or burns to operator while changing from trolley to reel or vice versa. Simple, safe, efficient, easy to install, can be mounted anywhere. For 250 or 550-volt service in single or double trolley and reel. Complete with cover.

P-G

THE POST-GLOVER ELECTRIC COMPANY
•ESTABLISHED 1892•
221 WEST THIRD STREET, CINCINNATI, 2 OHIO

was chosen executive secretary to succeed his father, D. C. Kennedy, who was elected secretary emeritus and will act in an advisory capacity, after 40 years' service in the same post with the organization since its inception. John L. Dickinson, who was reelected treasurer, also completed 40 years' continuous service.

NEW RIVER COAL OPERATORS' ASSOCIATION reelected the following officers at its annual meeting, Oct. 12, at Mt. Hope, W. Va.: Gilbert Smith, president; J. W. Garvey, vice president; Stanley C. Higgins, executive secretary; and P. M. Snyder Sr., treasurer.

NORTHERN WEST VIRGINIA COAL ASSOCIATION has reelected George S. Brackett and T. E. Johnson as president and vice president, respectively. Other vice presidents named were: J. J. Johnson, M. J. McAndrew and Thomas Ross.

•

Preparation-Plant Maintenance Studied

Coal-washery maintenance engaged the attention of the Southern Illinois Mining Electrical Group at its Oct. 5 meeting at the West Frankfort (Ill.) Country Club, with Paul W. Moran, preparation engineer, Pyramid Coal Corp., Terre Haute, Ind., the speaker. "Uniformity," said Mr. Moran, "always is the watchword for the preparation engineer."

Declaring that "the basic flow plan is the same for most coal-cleaning plants," Mr. Moran discussed maintenance points which in most cases do not stop the flow of coal or shut down the plant but do have a decided effect on the product and on the losses to refuse. Because stratification is likely to follow through the plant from the run-of-mine hopper, complete blending of the raw coal from the mine is an essential primary step. So baffles or other devices to maintain uniformity of size consist must be kept in place and in condition.

Likewise, jigs should be checked regularly for loose and broken screen plates that may partially block the refuse orifice or lose coal to the refuse. The control mechanism of the cleaning unit must be kept perfectly free to function and the refuse gate must promptly react to it. Accumulations of muck that would throw this mechanism out of balance or interfere with free operation of air passages must be removed.

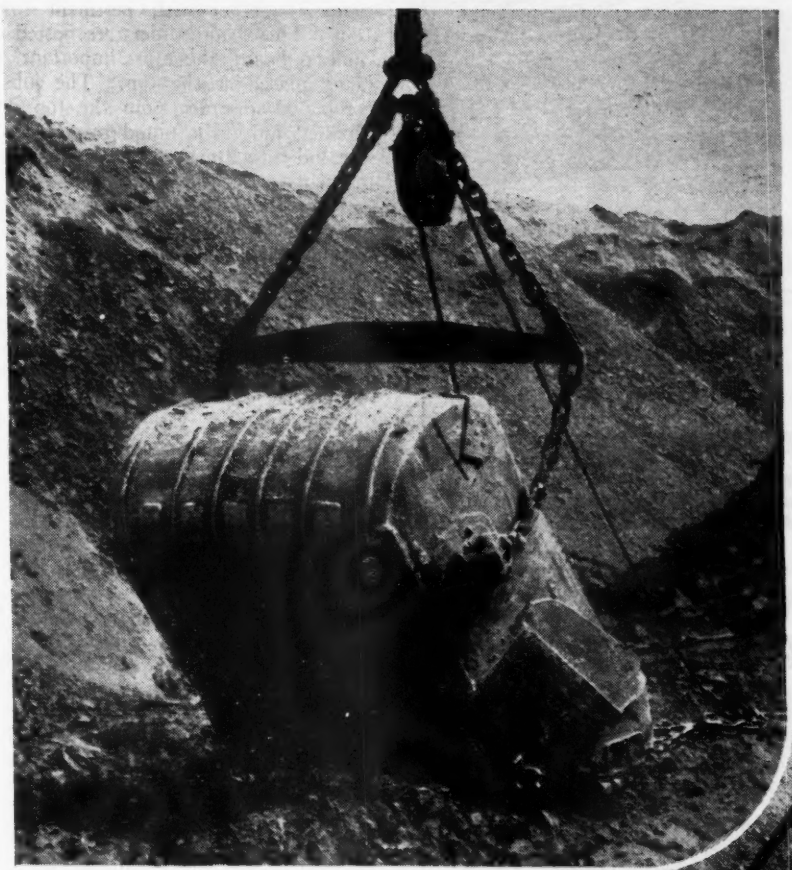
Reversing the stratification idea mentioned hereinbefore, there must be nothing in the cleaning unit to hinder the separation of refuse from coal by stratification and its removal by freely operating devices. If certain baffles and launder shapes tend to solve the problem of stratification they must be kept in working condition. Wear will be reflected in a decline of efficiency.

Maintenance of uniform pressure and flow of water is a major factor in the operation of wet cleaning equipment. In the absence of overhead cones or surge tanks, pump head is relied on to maintain pressure on the water lines. This water pressure and flow must be kept up to standard to preserve the necessary stratification to separate refuse from coal.

Many plants have special crushing systems for the preparation of stoker coals.

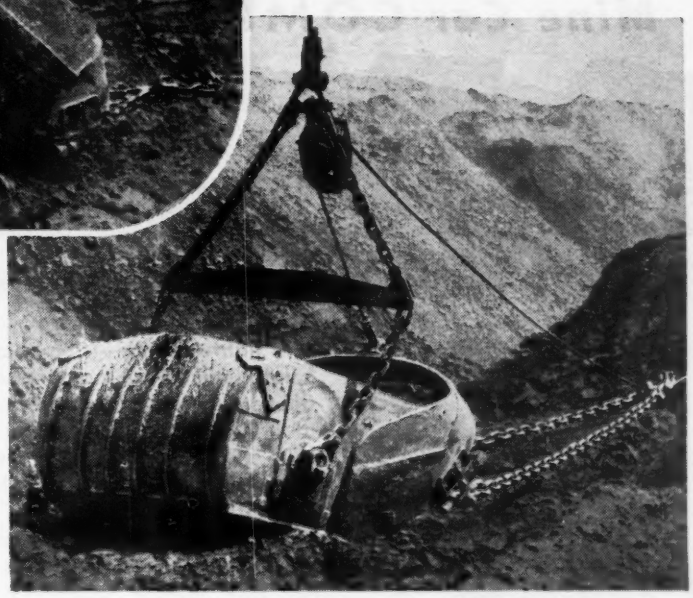
WHY

PAGE *Automatics* OUTDIG ALL OTHER DRAGLINE BUCKETS



ONLY A PAGE *Automatic* TAKES AND HOLDS DIGGING POSITION WITH ALL LINES SLACK . . .

A Page Bucket "automatically" (1) strikes on its forward arch, (2) rotates back onto its teeth and arch, holding this position with all lines slack . . . ready to dig a full load.



A PAGE *Automatic* DIGS RIGHT IN AT THE FIRST PULL OF THE LOAD LINE

With all weight on the teeth, a Page *Automatic* Bucket uses every ounce of that weight to dig in and get its load. This means faster digging at any depth. *Only a Page Bucket gives you this "automatic digging action."*

PAGE
Automatic DRAGLINE BUCKETS

PAGE ENGINEERING COMPANY, CHICAGO 38, ILLINOIS

Lee-Norse GREASING TRUCK

• Compact—mobile—convenient—the Lee-Norse Greasing Truck provides a complete "service Station on wheels" and permits regularly scheduled greasing of all mining equipment at the face.

This modern truck has a six-barrel capacity with three or more standard lubricants:

- ***Hydraulic Oil***
- ***Transmission Lubricant***
- ***High Pressure Chassis Lubricant***

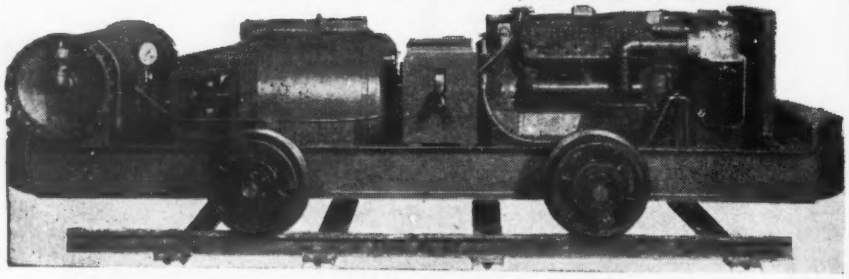
For greater efficiency in your mine, use Special Equipment by Lee-Norse.

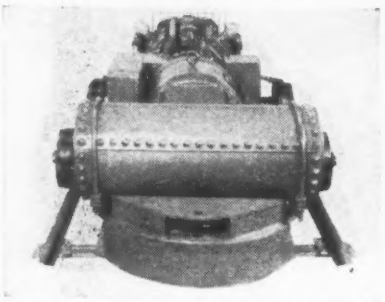
We also completely overhaul and factory rebuild various kinds of mining machinery—cutters—loaders.

Phone us—Charleroi 750

Lee-Norse Company
CHARLEROI, PA.

ACME "LOWBOY" Mine Car COMPRESSOR





REAR VIEW OF COMPRESSOR

Above view shows location of air receiver which is A.S.M.E. riveted type. Each end of outfit is provided with coupling for towing.

• A lightweight — compact — low height mine car compressor which delivers 92 cu. ft. of air per minute at 100 lb. pressure. The unit is driven by a 25 HP compound wound motor. Operating speed 1140 R.P.M.—voltage either 230 or 500 D.C.

The Acme "Lowboy" is specifically designed to meet the needs of present day mining especially mechanized properties. Being low in height it is adaptable to both high and low seam operations.

Bulletin No. 3920 gives complete description of unit and its many advantages in modern mining. Write for your copy today.

ACME COMPRESSOR CO.
Williamson, West Virginia

Improper maintenance of them will result in poor yields of the desired types of stoker coal, poor size consist and possible excess of fines, which result in lower realization for mine output.

Most important is a systematic scheme of maintenance, backed up by work orders and records for the guidance of maintenance men and the information of the operating department. Describing the system in use at the Victory mine, near Terre Haute, Mr. Moran said this consists of Lefax-size padded forms of work orders in duplicate, and a "Work Completed" record of 8½x11-in. loose leaves in book form. Work orders are dated and list the name and number of the unit to be repaired, together with pertinent instructions. These work orders are posted on a bulletin board, the most important order being placed at the top. The jobs are completed in order from the top down, supplies and labor noted on the reverse side and turned over to the operating shift foreman.

The records are then entered on the 8½x11-in. sheets, using a page for each separate washery unit. Thus it is easy to trace the history of any particular unit in the plant. This record makes possible a forecast of probable breakdowns, and a study of the performance is the basis for economical maintenance. Over a period of years it is useful in determining the relative value of various materials that enter into the maintenance of the various units in the plant.

•

Coal Publications

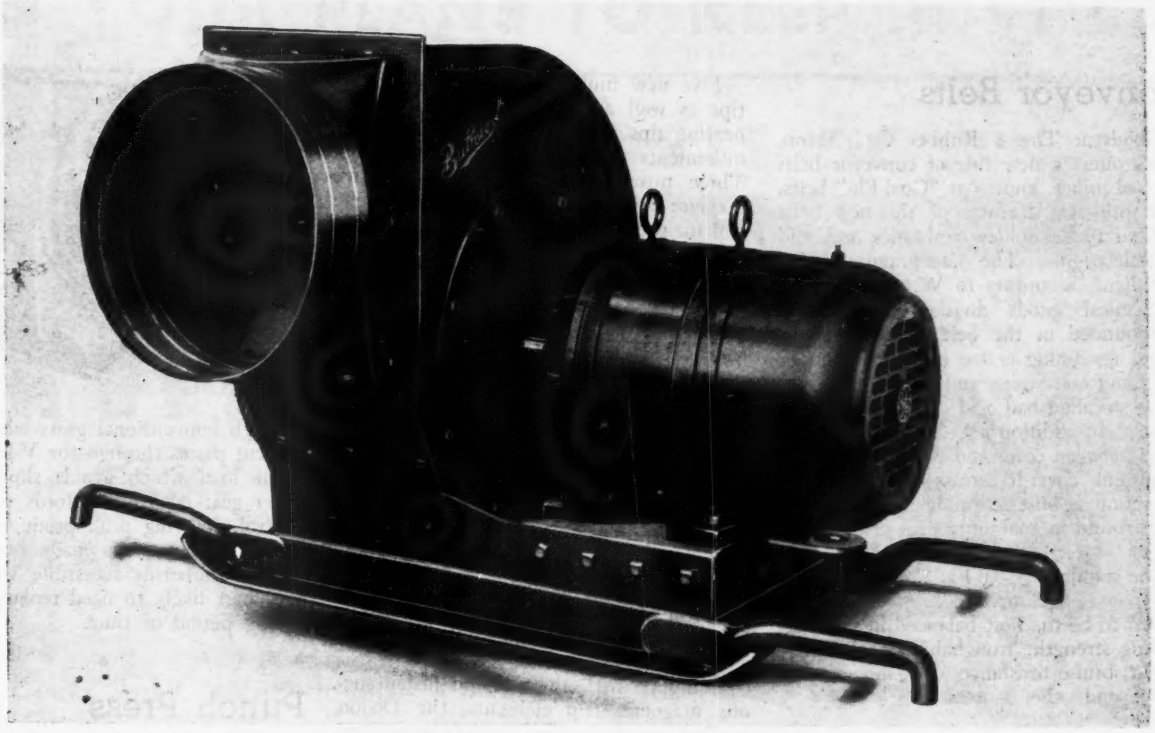
Rare and Uncommon Chemical Elements in Coal, by F. H. Gibson and W. A. Selvig, U. S. Bureau of Mines. T.P. 669, 23 pp., 5⅞x9⅛ in.; paper. Price, 10c. Interesting and informative, though merely a result of bibliographic research, much of which is derived from the U. S. Bureau of Mines' own publications and investigations.

Analyses of Kentucky Coals, by many authors, U. S. Bureau of Mines. T.P. 652, 323 pp., 5⅞x9⅛ in.; paper. Price, 40c. Introduction covers briefly geology, mining methods, preparation and statistical data embracing production, distribution and use. Coals analyzed include mine, tipple and delivered material, agglomerating indexes, ash fusibilities, specific gravities and sulphur forms.

Carbonizing Properties of Western Region Interior Province Coals and Certain Blends of These Coals, by several authors, U. S. Bureau of Mines. T.P. 667, 138 pp., 5⅞x9⅛ in.; paper. Price, 20c. The area thus described includes the coal fields of Iowa, Missouri, Nebraska, Kansas, Arkansas and Oklahoma. Many of the coals in this area have coking properties that make them suitable, singly or in blends, for metallurgical purposes.

Carbonizing Properties of Pocahontas No. 3 Bed Coal From Kimball, McDowell County, W. Va., and the Effect of Blending This Coal With Pittsburgh Bed Coal, by several authors, U. S. Bureau of Mines. T.P. 670, 35 pp., 5⅞x9⅛ in.; paper. Price, 10c.

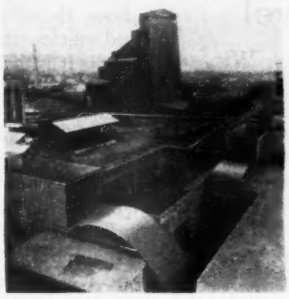
Heavy-duty portable Mine Ventilating Sets—



Large Ventilating Fans:

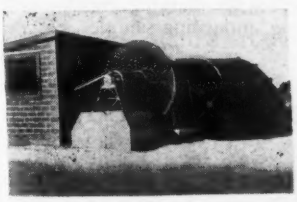
Some of the largest mine fans in the World were built by "Buffalo" and are in service today.

Centrifugal:



These "Limit-Load" Fans have all the inherent advantages of the Buffalo industrial-design fans, plus special construction for out-door installation. Oversize bearings, shafts and wheel-gauges assure uninterrupted operation. If you are considering the installation of large ventilating fans let us refer you to users of Buffalo equipment.

Axial Flow Fans:



For those installations where an axial flow fan is desirable, Buffalo builds the "Limit-Load" Axial Flow in a wide range of sizes. Special vanes used with these fans give a straight line air flow which eliminates turbulence at the outlet. Ask for nearest office for details.

Built for the roughest kind of handling, these Buffalo Portable Ventilating Sets for use with flexible tubing are giving very satisfactory service in a number of mines. Steel plate and angle construction keeps weight to a minimum, but gives great strength and rigidity. Inlet is screened, and outlet is fitted with grooved adapter so that tubing is easily attached. Base angles are curved to serve as skids.

Motors do not have to be oversize since the fan is the "Buffalo" non-overloading design. It is impossible to overload the motor regardless of whether you have 10 feet or 1000 feet of tubing on the discharge. Write for Bulletin 3024-C which gives complete details, dimensions, capacities and price.

Buffalo Forge Company

147 MORTIMER ST., BUFFALO, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo" MINE VENTILATION

TIPS FROM MANUFACTURERS

Conveyor Belts

Goodyear Tire & Rubber Co., Akron, Ohio, offers a new line of conveyor belts for coal mines, known as "Coal-Flo" belts. Two principal features of the new belts are said to be mildew resistance and acid neutralization. The acid-neutralization ingredient, according to W. C. Winings, mechanical goods division manager, is compounded in the belt covers and carcasses, remaining active indefinitely under mild acid conditions and lasting for years under so-called bad acid conditions in coal mines. In addition a breaker strip is provided between cover and carcass to provide maximum cover-to-carcass adhesion as a protection against stripping hazards sometimes found in coal-mine uses of conveyor belts.

The standard "Coal-Flo" belt consists of five plies of 28-oz. duck, said to have proved to be the best balanced in fastener-holding strength, troughability, rollability, weight, bruise resistance, cost, longevity of service and other factors.

•

Heating Torch

Air Reduction Sales Co., 60 East 42d St., New York 17, N. Y., offers a new medium-weight heating torch (Style 9802) especially designed for concentrated localized heating such as is required for bending, straightening and shrinking of steel plate as well as for silver-brazing of heavy copper plate in the manufacture of copper pipe. The torch is lighter in weight than many heating torches available in the past yet it is said to have equal gas capacity.

Five new multi-flame acetylene heating tips as well as two multi-flame propane heating tips are available to meet the requirements of every heavy heating job. Three mixers are available: for positive pressure acetylene, low-pressure acetylene and for propane. The available extensions include a 12-in. straight extension and 18-, 24-, and 42-in. angular extensions.

•

Circuit Breaker

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., offers a new 100-amp. De-ion circuit breaker said to require less space and to permit lighter structures for distribution panelboards, built-in applications and bus-duct plug-ins. All ratings are available in one compact breaker with uniform pole spacings and terminal arrangement, providing complete interchangeability between ratings. The new F frame permits a 100-amp. 600-volt a.c. or 250-volt d.c. rating.

Equipped with thermal and instantaneous magnetic trip elements, the De-ion fuseless circuit breaker permits maximum loading of circuits and fast resumption of interrupted service. Contact pressure increases with wear, thereby prolonging the life of contacts and breaker.

•

Convertible Shovel

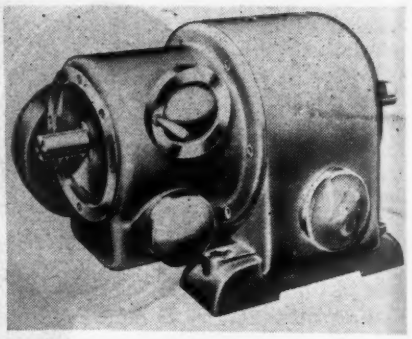
Koehring Co., Milwaukee 10, Wis., offers a half-yard shovel, Model 205, convertible to crane, dragline or pull shovel; also available as a cruiser crane mounted on rubber tires, and can be furnished for truck mounting. Outstanding improvements cited are: same boom for shovel or pull-shovel operation; trigger-fast dipper trip; independent unit traction gear case; easily removable machinery units; instant travel reverse; spacious walk-around area; headroom in all parts of cab. Orders are now being accepted on a priority basis for shipment when present military needs cease.

•

Variable-Speed Drive

Lombard Governor Corp., Ashland, Mass., offers a compact new type variable-speed drive for quick, sure control of line conveyor methods. The new drive uses the V-belt as a control medium only rather than for both drive and control, primary speed reduction being accomplished by conventional gearing methods.

Through this new gearing arrangement, it is said, 90 percent of the power goes through conventional gears while only 10 percent passes through the V-belt, a minimum load which avoids slippage. The lower gear ratio also affords fine hairline control, insuring peak production speeds. Low maintenance is made possible, it is said, as the easily accessible V-belt is the only part likely to need replacement over a long period of time.



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Punch Press

Combining the features of its V-way vise and the gap-style press, Reimuller Bros. Co., 9400 Belmont Ave., Franklin Park, Ill., offers a new precision bench press of semi-steel construction. Incorporating V-ways to eliminate the use of die shoes, the new press is designed for speedy and efficient handling of many production jobs. It is made in one size, 5-ton, and has a 5x6-in. platen with 7 in. of ram movement.

Only two levers are used in the hydraulic foot control: one to apply pressure up to the rated tonnage, the other for release, which has a two-speed return. No outside airlines or power is needed and unit is self-air-eliminating. Operator's hands are free when operating. The same machine is adaptable with proper equipment to be used as a tensile and compression testing unit up to 5 tons and as a pipe vise to handle up to 6-in. pipe, or as a shear for ¼-in. plate or ½-in. rounds. It also can be adapted for marking, notching, riveting, crimping, mounting samples, etc.

•

Bucket Lubricator

Gray Co., Inc., Minneapolis, Minn., offers a new bucket pump called the "Block Buster" for lubricating trucks and machinery. Designed to handle heavy-duty lubricating jobs easily and quickly, a few of its important features are said to include an easy-operating double-acting

BASIC ★ ★ ★

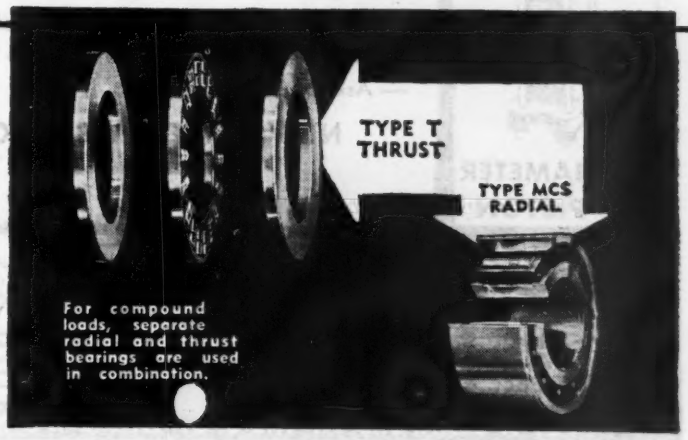
IN YOUR PLANS TO KEEP POSTWAR

MAINTENANCE COSTS DOWN . . .

ROLLWAY

Right-Angle

BEARING LOADING



Costs must come down—especially maintenance costs—if you want to weather the storms that peacetime readjustment of prices, markets and competition will bring.

So make a practical start now. Change over your production machinery to Rollway's right-angle bearing loading. That will cut maintenance cost and replacement cost . . . it will free your production machinery from frequent shut-downs for bearing replacements.

Design your postwar products around the Rollway bearing principle, too. You'll get higher load capacity and longer life expectancy in given dimensional limits. You'll get more compact design, a better operating, more satisfactory product with less maintenance trouble.

Right-Angle Loading Reduces the Unit Load

Rollway's right-angle Bearings limit the load carried by each bearing to a single load component —either *pure radial* or *pure thrust*. The unit load per roller is lower, the load capacity for a given dimension is higher. No oblique loads or resultants, no compound loads of any kind can pile up to increase the computed load beyond the elastic limits of the structure or housing. Resistance to shock and vibration is increased. Pinch-out of rollers is eliminated—there's less end-rub, less wear-back of roller ends. Longer bearing life and lower maintenance and replacement costs are normal results.

Standard Sizes for Most Applications

S.A.E., or American Standard metric dimensions and tolerances assure low cost and ready availability for most applications. Let our engineering specialists help you in making a correct selection. Just send a drawing or detailed description. No charge or obligation for a free, confidential analysis and recommendation.

ROLLWAY BEARING COMPANY, INC., SYRACUSE, NEW YORK

BUILDING HEAVY-DUTY BEARINGS SINCE 1908 **BEARINGS**

SALES OFFICES: Philadelphia • Boston • Pittsburgh • Youngstown • Cleveland • Detroit • Chicago • St. Paul • Houston • Tulsa • Los Angeles

There's a
BRANFORD PNEUMATIC VIBRATOR for EVERY SPOT!

PIGMY
3/8" PISTON DIA.

GIANT
8" DIAMETER PISTON

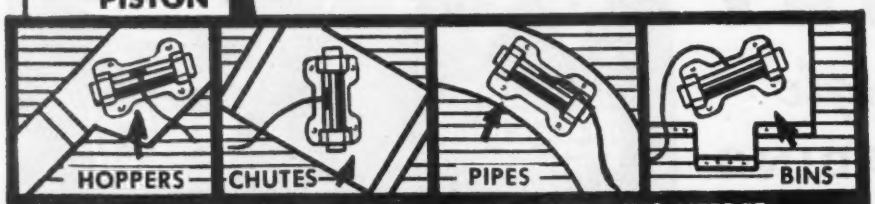
WHERE CLOGGING OCCURS
in Pipes, Hoppers, Bins, Chutes, etc.

Quick Acting Starting Valve
Controls Rate of Flow

Write—State Problems

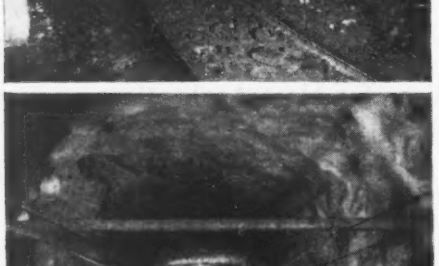
Send plan of equipment — Specifications — Tonnage handled — Wet or dry materials — Size of material — Ask for Bulletin "E".

NEW HAVEN VIBRATOR CO.
150 Chestnut St.
NEW HAVEN 7, CONN.



PUT A BRANFORD AT THE SPOT WHERE IT'S NEEDED

CEMENT GUN COMPANY
"GUNITE" CONTRACTORS
GENERAL OFFICES—ALLENTOWN, PENNA., U.S.A.



INVALUABLE FOR MINE PROTECTION

"GUNITE" has been found invaluable for the treatment of ribs and roofs in mine entries, slopes, and haulage ways.

The advantage of "GUNITE" may be summed up as follows:

1. Elimination of falls.
2. Additional safety afforded by additional height and greater visibility provided by the "GUNITE" surface.
3. Diversion of water, behind the lining, to drains leading to sump.
4. "GUNITE" surface takes rock dust readily.
5. Cleaner entries and passageways.
6. Facilities mine ventilation.
7. Lowers mine maintenance costs.

See our Bulletin 2200 for details, or have our engineer around for a discussion of your needs.

MANUFACTURERS OF THE "CEMENT GUN"

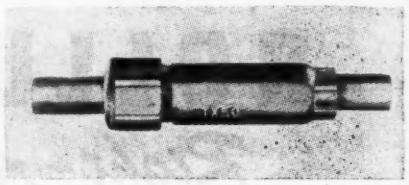
pump developing 4,000 lb. pressure; hardened-steel precision-ground piston; simple positive foot valve 18-gage seam-welded container with ingenious pump support bracket which keeps the pump from being completely removed when filling; and a strong carrying handle that acts on a large stud bolt to hold the cover and pump in position on the container. The conical-shaped hopper bottom automatically feeds all the lubricant in the container to the foot valve and prevents channeling and loss of prime.

Folder BB-644P describes this unit.

•

Conduit Fitting

What is stated to be a new idea in expansion fittings is offered by the O. Z. Electrical Mfg. Co., Brooklyn, N. Y. Known as Type TX, it is a complete unit especially designed for thin-wall conduit to compensate for expansion and contraction in a line of conduit. It is furnished with extension nipples already in place for quick, easy installation on conduit in sizes from ½ to 2 in. Special packing seals the head and effectively prevents water or moisture from entering. Complete details of the regular O. Z. line are given in a new 140-page catalog.



•

Printer

Charles Bruning Co., Chicago, offers the BW-Copyflex Model 2 continuous printer, making it possible to duplicate anything drawn, typed, printed or illustrated, as well as to make prints. Original material with copy on both sides can be reproduced on either side or both sides. The Model 153-M BW developer is offered for developing BW prints exposed on the Model 2. Prints are delivered ready for use. Folder describes both units.

•

Flux

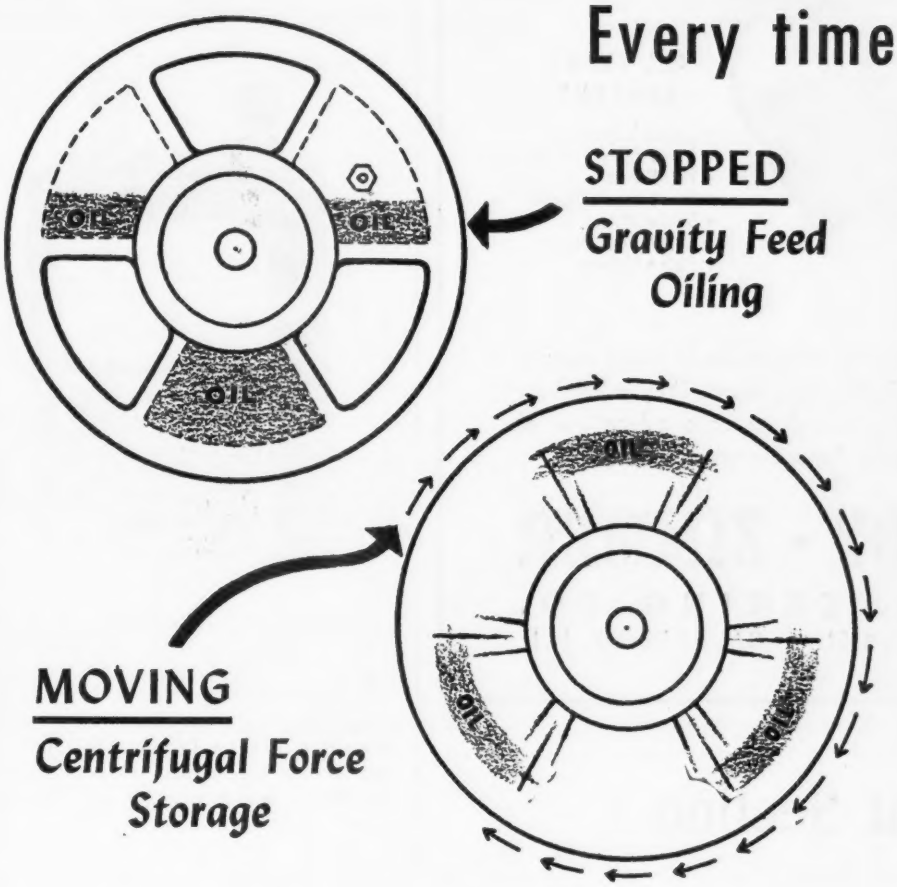
Air Reduction Sales Co., 60 East 42d St., New York 17, N. Y., offers a flux designed to promote uniformly successful tinning of cast iron prior to brazing. The manufacturer states that this flux, known as Airco Hi-Bond, overcomes the difficulties encountered in tinning cast iron due to its graphitic nature and makes possible highly satisfactory tinning of cast iron, especially of high carbon and silicon content or low combined carbon analysis.

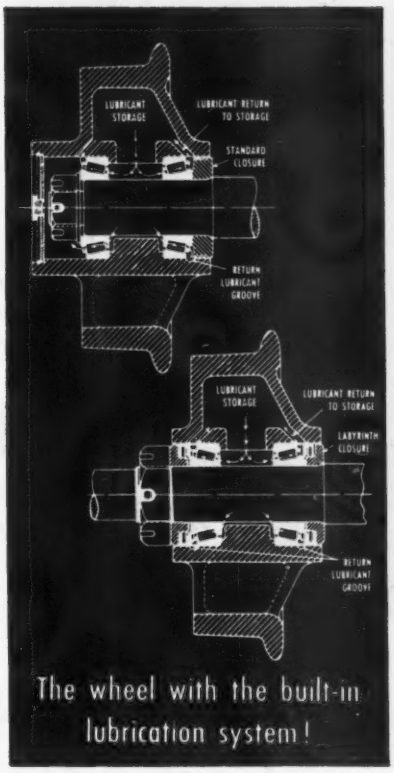
The flux does not take the place of the regular flux used for the actual brazing operation. Hi-Bond flux may be applied as a water-mixed paste or as a powder sprinkled on the surface which has already been heated to the required temperature. It is packed in 1-lb. glass containers.

The secret of long service

Automatic Lubrication

Every time it starts!





When "Oilspok" Wheels start turning, they start lubricating . . . every time . . . automatically. No greasing attention needed. One oiling lasts 5000 to 6000 miles.

Each spoke of "Oilspok" Wheels has three ports leading into the hub—one large central port and two narrow rectangular ports, situated at the outside of each bearing. The lubricant passes readily through the large central port to the bearings and is then thrown back through the rectangular ports by centrifugal force to the storage reservoirs.

Thus, the lubricant in "Oilspok" Wheels is free-flowing. No chance to gum up or cause excessive tread wear by churning resistance like that of heavy, adhesive greases.

That is why "Oilspok" Wheels have longer life at lower maintenance cost. Get the best in mine wheel cars. Use "Oilspok" Wheels. Write for full information.—HOCKENSMITH WHEEL & MINE CAR COMPANY, *Established 1877. Penn, Pa. Phone—Jeannette 700.*

"OILSPOK" WHEELS WILL—

1. *Increase Wheel Life.* Excessive tread wear—caused by the churning resistance of heavy greases—is eliminated. Free wheel rotation.

2. *Save Power.* Free wheel rotation means no power lost by churning grease. The lubricant in the "Oilspok" wheel is fluid and free flowing.

3. *Save Lubricant and Lubricating Labor.* "Oilspok" lubrication is positive and continuous—no loss due to bearing pumping pressure or air expansion. One greasing lasts several years—less labor cost and loss of car service.

4. *Give Longer Bearing Life.* Bearing lubricant is constantly changed—bearings clean and cool—constant circulation maintains lubricant in better condition.

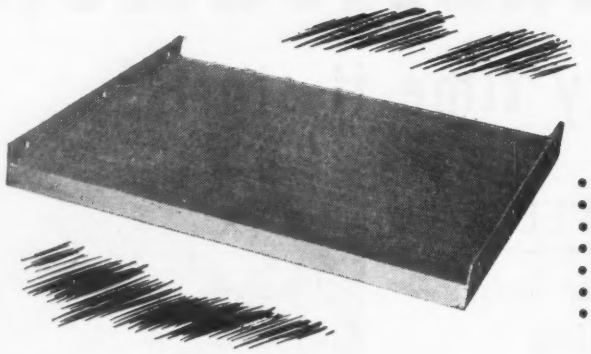
5. *Increase Axle Box Life.* "Oilspok" wheels are free turning under all temperature conditions—no chance of axles turning in dry boxes.

6. *Eliminate Disadvantage of Small Diameter Wheels.* Higher hub resistance—a characteristic of small diameter wheels with large bearings—is substantially reduced in "Oilspok" wheels with their positive, circulating fluid lubrication.

7. *Provide Stronger Wheel—No Extra Weight.* "Oilspok" wheels have tapered box-section spokes—the strongest possible construction for resisting side thrust and vertical loads. Same weight as standard wheels for various bearing and axle sizes.

Hockensmith *"Oilspok"* Wheels

FOR BETTER *Results* AND *Low Cost*
USE "BEE • ZEE" SCREENS



ALL TYPES SCREENS

- Chute & Conveyor
- Rigid Panel Vibrator
- Heat Dryer
- Hook-type Vibrator
- Shaker Panel
- Centrifugal Dryer
- Sizing Screen

Bixby-Zimmer round-rod screens are tailor-made in many designs for all sizing, dewatering and drying equipment. They're built for long life and efficient screening operation. Take advantage of "Bee-Zee" savings — call or write for information today.

BIXBY • ZIMMER
ENGINEERING CO.
961 Abingdon St. • GALESBURG, ILL.

The Searchlight Section of Coal Age

features Employment, Equipment and Business Opportunities identified with the mining of coal.

"Searchlight" ads are referred to regularly by readers interested in such "Opportunities."

You can therefore bring "Opportunities" you have to offer to the attention of these readers quickly, and at small cost, through an advertisement in the Searchlight Section. (See pages 179–183)

MESCOWELD M5-F
flashwelded
RAIL BONDS

FEATURES:

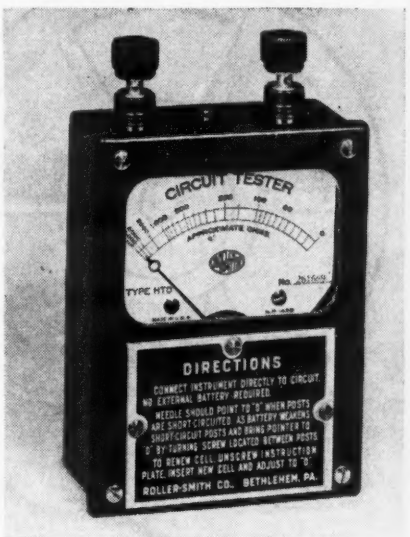
1. Can be used on top of base of any size rail.
2. Terminal hook holds bond in place while weld is being made.
3. Readily accessible for welding.
4. Solid terminal prevents installation damage.

Write for
MOSEBACH CATALOG No. 44

MOSEBACH ELECTRIC & SUPPLY CO.
1115 Arlington Ave. Pittsburgh 3, Pa.

Pocket Circuit Tester

A compact lightweight circuit tester to determine the resistance of an explosive cap or other electrical circuit with the scale reading directly in ohms is offered by the Roller-Smith Co., Bethlehem, Pa. Furnished in a range from 0-10,000 ohms and also obtainable with two ranges—0-10,000 and 0-50,000 ohms—the instrument is extremely compact, measuring



4½ x 3 x 1½ in. and weighing only 19 oz. It consists of a small high-grade d'Arsonval type d.c. voltmeter connected in series with a standard flashlight battery. Terminals are provided for connecting to the circuit under test. Removal of the plate on front permits easy replacement of dry cell and also gives access to internal zero adjuster. Details available in Catalog 123-b.

•

Hand Searchlight

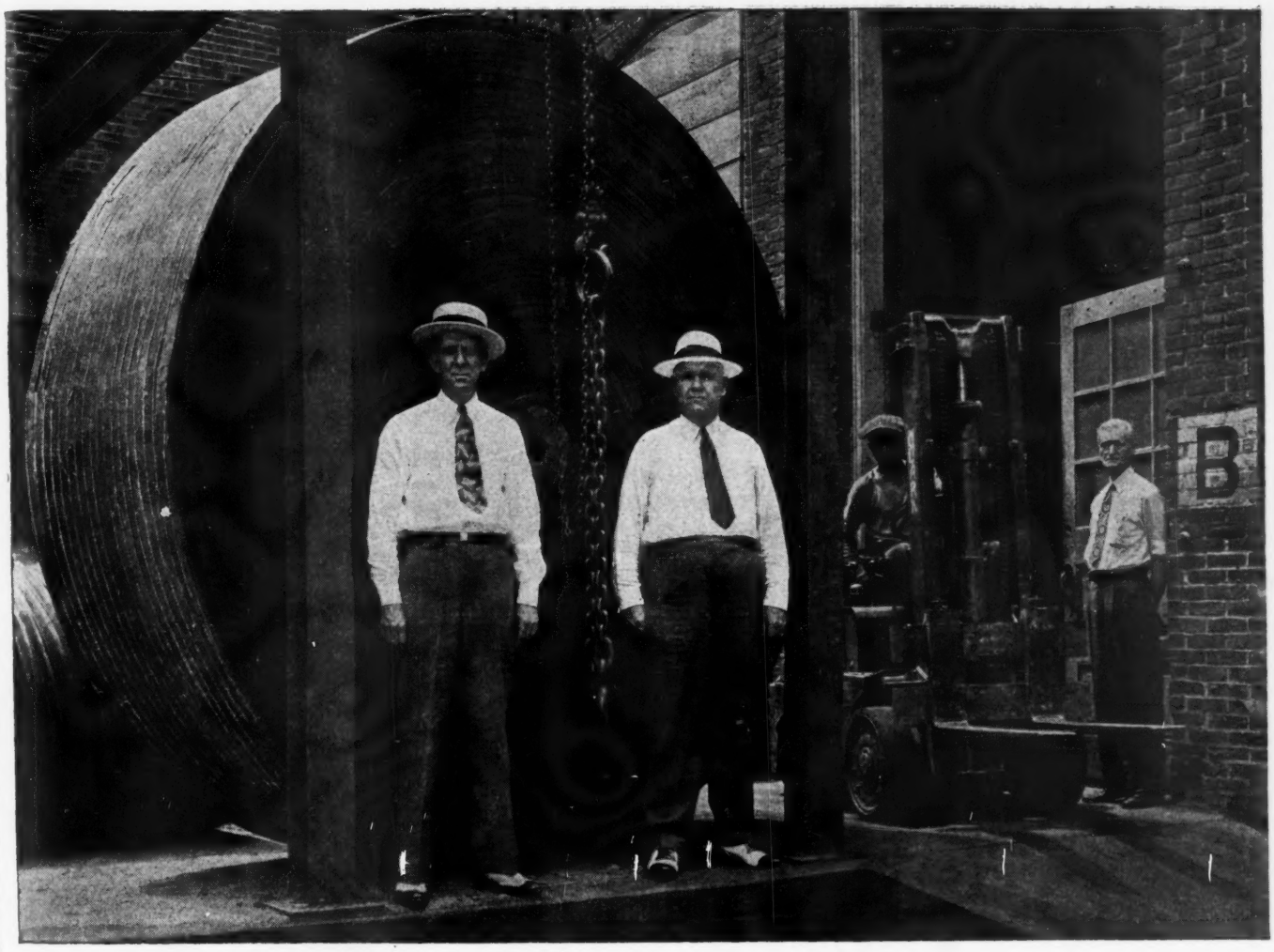
U-C Mfg. Co., Chicago, offers the "Big Beam" No. 411 portable electric hand searchlight, which is said to project an intense beam of more than 2,500 ft. or, by means of a snap-on lens, give the same volume of light over a wide area. Powered by a heavy-duty shockproof 6-volt storage battery, rechargeable from any a.c. charger, d.c. line or light plant, recharging is said to be simple, clean and safe and it is not necessary to remove the battery from the container. The lamp head can be turned in any direction and stays adjusted. The lamp can be set almost anywhere and by use of a hold-down can be securely anchored to any flat surface.

•

Slide Rule

Charles Bruning Co., New York and Chicago, offers the new Bruning 2401 5-in. pocket slide rule. The maker emphasizes that this is not a "duration substitute" but rather a carefully made, smooth-working precision instrument designed for fast, easy operation.

A notable feature, says the manufacturer, is the precision of its graduations. Being molded in, these graduations are an in-



War also needs big BELTS

While Belts of this size are being produced for use in the War Effort, it naturally takes that amount away from the quantity that normally would go to the civilian trade.

Quaker is maintaining Belt Production at peak figures. Demands of the War require thousands of feet. It looks much brighter now to that day when production can be devoted 100% to civilian requirements.

Belts, like the one illustrated, will convey thousands of tons of coal, gravel, sand, cement, crushed stone, concrete, or similar products and do it economically, for Quaker Belts are built to give long service, and they do it!

This 36" 7 Ply Conveyor Belt, made in one piece, is over sixteen hundred feet long, with a net weight of 15,409 pounds, is just one of the many large and unusual Belts that Quaker is continually producing. Years of experience in Belt making, as well as knowledge in the workings of Synthetic Rubber enables us to give you extra high quality Belts—the kind for which Quaker has long been noted.

For sixty years, Quaker has been manufacturing Quality Industrial Products . . . Belting—Hose—Packings—and Moulded Parts. Regardless of what your rubber problem may be, feel free to consult with us—

"If there is a way to get it done—Quaker will do it"

QUAKER RUBBER CORPORATION

PHILADELPHIA 24, PA. • NEW YORK 7 • CLEVELAND 15 • CHICAGO 16 • HOUSTON 1

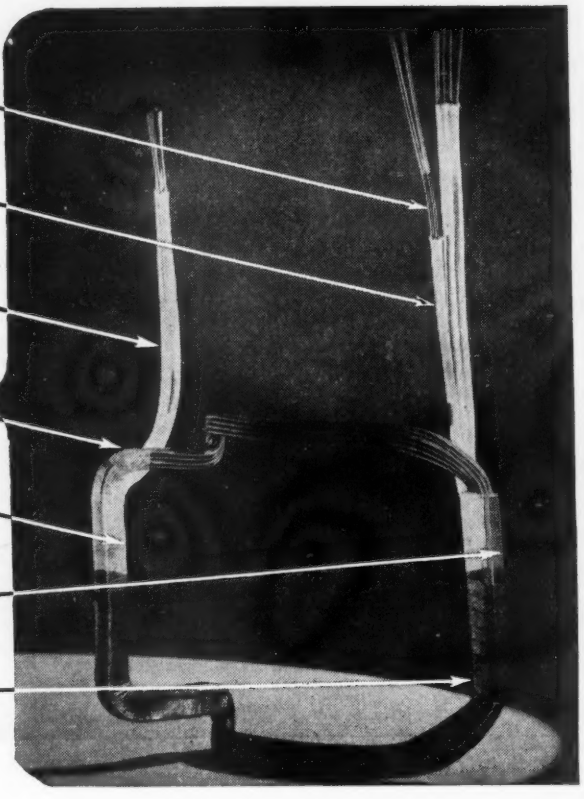
Western Territory

QUAKER PACIFIC RUBBER COMPANY • SAN FRANCISCO 5 • LOS ANGELES 21

7 PLACES TO USE FIBERGLAS* in Motor Insulation...

On form-wound coils—of any span
(round or rectangular wire)

1. Fiberglas multiple-wound yarn served on wire.
2. Fiberglas braided sleeving.
3. Fiberglas tape.
4. Varnished Fiberglas tape.
5. Fiberglas-mica combination.
6. Fiberglas base laminated material.
7. Fiberglas-impregnated tape.



Fiberglas is only a part—but an important part—of the finished insulation job. It furnishes a *stable base* for the varnish to cling to. If properly applied, Fiberglas *outlasts* any other material in this basic role—especially where severe heat, moisture and vibration conditions exist. Because it is inorganic, it makes possible *longer life* for the insulating varnish. Fiberglas does not shrink—from heat, age or any other cause. Hence, once it is applied, it forms a *dimensionally stable* base for the impregnating varnish. Since it does not shrink, windings do not tend to loosen, and hence coil insulation is not harmed by movement of one coil against another, or against stator iron.

It is not difficult to apply Fiberglas correctly—if consideration is given to Fiberglas characteristics. For example: Fiberglas tape "gives" very little (maximum of 3%). This produces a coil with an exceptionally "tight wrap". But, on the other hand, care must be taken in wrapping sections of coils that must be bent or twisted severely, otherwise the bending might tear or break the tape.

Fiberglas is rolling up new performance records every day in "tough" motor applications where even other inorganic insulating materials are comparatively short-lived . . . All forms of Fiberglas electrical insulation are available for immediate delivery. Ask your distributor or write *Owens-Corning Fiberglas Corporation, 1862 Nicholas Building, Toledo 1, Ohio; in Canada, Fiberglas Canada, Ltd., Oshawa, Ontario.*

WHAT IS FIBERGLAS? Fiberglas is an electrical insulation made up of fine, strong glass fibers which are twisted into yarns and wrapped around wires, woven into tapes and cloths, imbedded in plastics, braided into sleeves, twisted into cords—to give all the forms of insulation required in electrical equipment.

FIBERGLAS *ELECTRICAL INSULATIONS*

*T. M. Reg. U. S. Pat. Off.

ARMY E NAVY

YARNS • TAPES • CORD • SLEEVING • CLOTH AND OTHER FORMS

tegral part of the rule—will not lose visibility through use. A, B, CI, C, D, K, S, L and T scales are shown on the rule to adapt it to the widest possible range of service. The beveled edges are in graduated scales of both inches and centimeters.

•

Booster Charger

Guyan Machinery Co., Logan, W. Va., offers a resistor type booster charger for storage batteries to enable operating companies to give storage batteries operating mobile equipment a quick auxiliary charge from the trolley wire back in the mines during short idle periods of the workday.

•

Wood Preserver

Quigley Co., Inc., 527 Fifth Ave., New York 17, N. Y., offers Triple-A copper naphthenate wood preserver to control or eliminate dry rot, fungi and molds, whether the lumber be in an industrial structure, on a farm or in a home. An application, it is said, will deeply penetrate and impregnate the wood, sealing it against the destructive influences of wood-destroying organisms. One gallon will treat about 200 sq.ft. of surface. Shipped in 1-, 5-, 30- and 55-gal. containers.

•

Truck Tires

Goodyear Tire & Rubber Co., Akron, Ohio, offers a tread design for truck tires of synthetic rubber said to retard the growth of tread cracks and reduce the running temperatures of the tires by as much as 50 deg. Goodyear engineers described the new tread design as "revolutionary" because, they said, "it was developed especially to meet synthetic rubber's peculiarities rather than a new attempt to adapt methods used in the tread designs of natural rubber tires."

In the new "Hi-Miler S Rib" tread, as it has been designated, retarding of crack growth is accomplished, it is said, by altering the conventional continuous-tread ribs to include terminals at approximately every half inch in the crevice between the ribs. Reduction of the heat is accomplished by a completely ventilated shoulder on each tire instead of the conventional unbroken-rib-type shoulder.

•

Filling Compound

Sterling Varnish Co., 182 Ohio River Blvd., Haysville, Pa., has developed a new filling compound, designated as S-182, for lifting magnet cases, potting small transformers and for general filling work. A firm material with considerable resiliency and withstanding extremely high or low temperatures, S-182 is said to have great internal cohesion, thus minimizing the danger of disintegration and severe stresses.

The compound is supplied in two separate parts—S-182A, a viscous liquid, and S-182E, of low viscosity, which must be mixed immediately prior to use, as they react slowly at room temperatures. However, the mixture retains sufficient liquidity

5 reasons why AMERICAN BRATTICE CLOTH is the logical choice for your operations

- It is impervious to flame, fungi and shrinkage.
- It is closely woven, of highest grade materials, to reduce air leakage to a minimum.
- The surface is smooth . . . not easily damaged by passing cars or machinery.
- It may be moved many times . . . used over and over.
- It is easy to install, and once installed requires no maintenance.

Write today for complete information on AMERICAN Brattice Cloth.

Our large factory stocks enable us to make prompt deliveries on your orders.

THE AMERICAN BRATTICE CLOTH CORPORATION
WARSAW • INDIANA

CRACK DOWN ON CRACK-UPS

Freezeproof Coal with Wyandotte Calcium Chloride

Cracking frozen coal to get it out of the car costs your dealers time and money—prevents your product reaching the consumer as it was shipped from the mine.

Wyandotte Calcium Chloride, added to coal as it's put into the car, will avoid these wasteful crack-ups, put needed railroad cars back in service in a jiffy. It'll build dealer good-will for you too—to serve you well when selling is again important.

Coal treated with Wyandotte Calcium Chloride flows freely, even at sub-zero temperatures. It doesn't have to be smashed to bits in the unloading.

This coupon will bring you detailed information about treating coal with Wyandotte Calcium Chloride. Mail it today.

WYANDOTTE CHEMICALS CORPORATION
Michigan Alkali Division
Wyandotte, Michigan

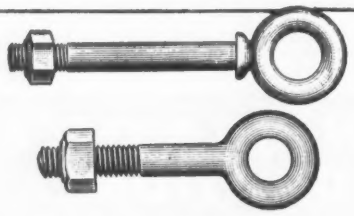
Send me literature and further information about the uses of Wyandotte Calcium Chloride.

Name_____
Address_____
Title_____

Wyandotte CALCIUM CHLORIDE
REG. U. S. PAT. OFF.
WYANDOTTE CHEMICALS CORPORATION
MICHIGAN ALKALI DIVISION • WYANDOTTE, MICHIGAN

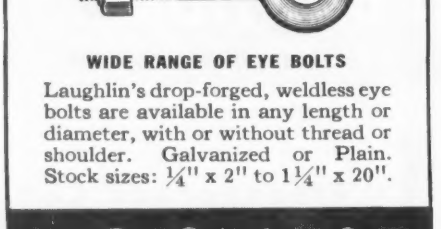
HERE'S A LINK FREE FROM PLAY OR SHEARING ACTION ON THE RIVET

Laughlin's drop-forged, heat-treated "Missing Link" is matched under pressure . . . so there is no play between the halves, no shearing action on the rivet. Under stress, the rivet merely holds the missing link together. The interlocking lugs take the load.



WIDE RANGE OF EYE BOLTS

Laughlin's drop-forged, weldless eye bolts are available in any length or diameter, with or without thread or shoulder. Galvanized or Plain. Stock sizes: ¼" x 2" to 1¼" x 20".



SHACKLES MADE TO U. S. GOVERNMENT TOLERANCES

Drop-forged steel, weldless anchor shackles, made in all sizes from 3/16" to 2½". Can be furnished with either screw pin, round pin or bolt and nut. Galvanized or Plain-finish.

Write for latest Catalog on Laughlin Industrial Hardware

Distributed through Coal Mining Catalogs

FORGING A SHARE IN VICTORY

THE THOMAS LAUGHLIN Company PORTLAND 6, MAINE

for pouring for a period of four to five hours. Though very heavy, the compound penetrates into small interstices. At 60-79 deg. C., S-182 compound starts to set in about one hour and becomes well dried overnight. When baked at 105-110 deg. C. it reaches its maximum hardness in one to six hours, depending upon the mass involved. Further baking of the compound has no marked effect. It is said to have high dielectric strength, low coefficient of expansion and to be water-resistant and oilproof.

•

Plastic Goggle

Eastern Equipment Co.,, Inc., Willow Grove, Pa., offers the Amcoweld Plasti-Goggle, a new safety goggle designed to give undisturbed and unrestricted vision coupled with maximum protection against impact hazards. Made of one-piece clear Plexiglas, the lens area extends in an unbroken curve from temple to temple without corners or sharp bends. Coupled with this is complete absence of rivets, bars or seams. The goggles are said to be spatter-resistant, light in weight and, because of smoothly rolled edges and ¾-in. wide full elastic headbands, comfortable to wear.

•

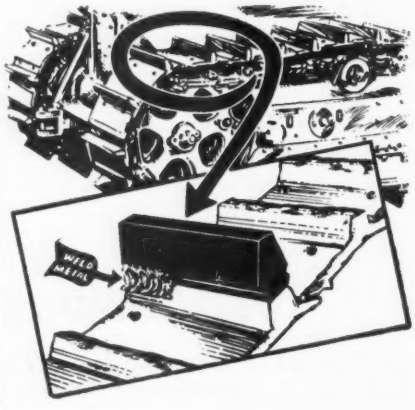
pH Buffer Tablets

Burrell Technical Supply Co., Pittsburgh 19, Pa., offers Coleman certified buffer tablets, said to be compounded of C. P. chemicals only, made and tested under rigid laboratory control, hermetically sealed in a glass vial—providing a simple and accurate method of preparing buffer solutions for the laboratory. Available in steps of 0.20 pH, these buffer tablets cover a range of 2.00 to 12.00 pH. An accurate buffer solution, it is said, can be prepared quickly and economically by merely dropping one buffer tablet in 100 ml. of warm distilled water, and the resulting solution will be accurate within 0.20 pH.

•

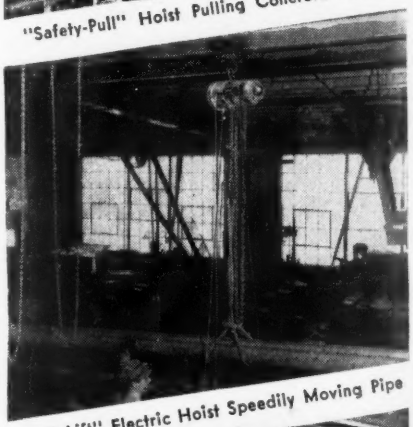
Grip Lugs

Allied Steel Products, Inc., Cleveland, Ohio, offers Bulldog brand tractor grip lugs, which are said to make it unnecessary to tear down track assembly and replace worn grouser shoes with new parts when a simple repair operation will restore the gripping power of the track. This, it is stated, is accomplished by merely welding

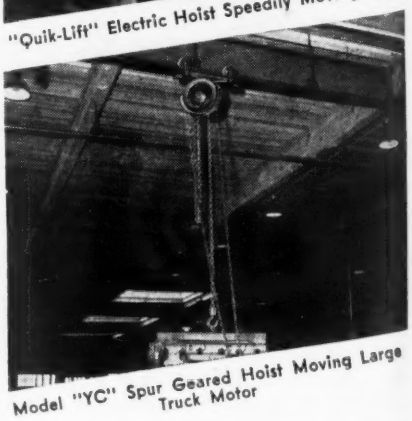


COFFING HOISTS

"Safety-Pull" Hoist Pulling Concrete Forms



"Quik-Lift" Electric Hoist Speedily Moving Pipe



Model "YC" Spur Geared Hoist Moving Large Truck Motor

Write Today for Catalog GG-6

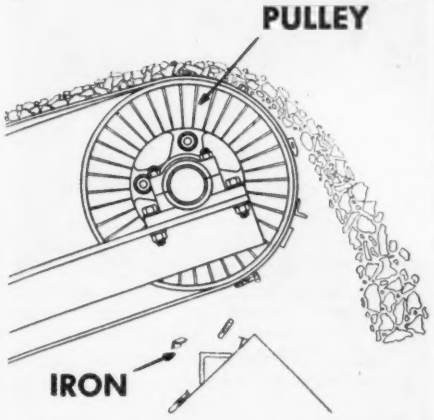
FOR SPEED
SAFETY
ECONOMY
DURABILITY

IN PRACTICALLY ALL LINES OF INDUSTRY COFFING HOISTS ARE PLAYING A PROMINENT PART IN SPEEDING UP
CONSTRUCTION
PRODUCTION
MAINTENANCE

COFFING HOIST COMPANY
Danville, Illinois, U. S. A.

FOUND

A No-Cost Way to Ship Stoker Coal Iron-Free From the Mine!



Most operators recognize the desirability of shipping stoker coal without any iron in it. We always thought it was worth spending money to do it and sold Dings Magnetic Separators on that basis. Needless to say, we were not the least surprised to find that one of our good customers was making a direct profit on his Dings Pulley.

Here are the records based on data from C. B. Scholl, Chief Engineer, Boone County Coal Corp., Sharples, W. Va.:

Based on depreciating the Dings Pulley in 10 years (most Dings Pulleys last for 25 to 40 years) the annual costs for the first 10 years were $154.10 for depreciation and $85.54 for electricity, no maintenance or repairs. This totals $239.64, but the pulley recovered tramp iron that was sold as scrap for $243.00, netting $3.36 per year direct profit. The next 10 years should be "lulus."

It pays to buy the best in magnetic separators. Write to Dings for literature.

Dings Magnetic Separator Co.
506 East Smith Street, Milwaukee 7, Wis.
World's Largest Exclusive Builders of Magnetic Equipment

Dings MAGNETIC SEPARATION HIGH INTENSITY

onto the old grouser shoe a specially designed steel bar with a groove and bevel to facilitate laying welding bead along the edge which holds the bar and the grouser shoe together as in a vise. The material is a special-analysis work-hardening steel which gets harder and tougher with use, often outlasting the original grouser, it is stated.

•

Welder's Cape

Eastern Equipment Co., Inc., Willow Grove, Pa., offers the Amcoweld Pro-Tecto-Cape for welders. Made of high-grade durable chrome leather, incorporating under-arm flaps and a collar that may be turned up, the coat is said to protect the wearer completely even when he is doing overhead welding. The collar is securely held in an upright position by special tabs and a snap fastener. In addition, the design provides freedom of movement and ventilation. Bib front is equipped with snap fasteners for easy removal.

•

Slide Rule

A new decimal point locator and slide rule that will determine the decimal point mechanically in involved expressions with results up to 19 places is offered by Pickett & Eckel, 53 West Jackson Blvd., Chicago 4, Ill.

A novel scale arrangement gives 30 in. accuracy for cube root, 20-in. scale accuracy for square root. One setting of the hairline enables the computer to read square root, cube root and logarithm. One setting of the hairline also determines the decimal-point location for square root and cube root.

The device, it is said, so simplifies slide-rule calculations that persons with a very limited mathematical background can evaluate and point off problems containing cube root, square root, log and trig factors. An illustrated instruction manual written by M. L. Hartung, associate professor of the teaching of mathematics, University of Chicago, is furnished giving instruction for beginners, rules for operating the decimal point locator, and presenting the mathematical theory of mechanical decimal point location. The slide rule is 11 in. long, 2 in. wide and $\frac{1}{8}$ in. thick.

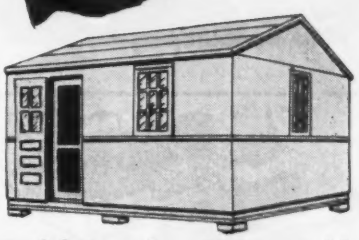
•

Industrial Notes

CHARLES ROEBLING TYSON has been elected president of John A. Roebling's Sons Co., manufacturer of wire products with plants in Trenton and Roebling, N. J. He succeeds the late William A. Anderson, who died Sept. 10. Mr. Tyson is the grandson of Charles G. Roebling, son of the founder. Lt. Joseph M. Roebling, now serving abroad with the U. S. Army Air Corps, has been elected chairman of the board. Archibald W. Brown has been elected treasurer and H. D. Rathbun as secretary and assistant treasurer.

AXEMAN-ANDERSON ASSOCIATES, 233 West St., Williamsport 3, Pa., has been organized by J. E. Axeman and W. S.

SPECIALIZED BUILDINGS



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Home front news is vital on the fighting front. Write a fighting man *today*.

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Rebuild your
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WITH BULLDOG
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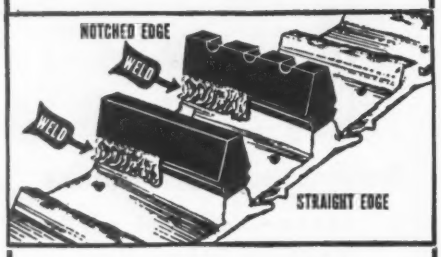

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Mango Bars for Repointing
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ALLIED STEEL PRODUCTS Inc.
N. B. C. Bldg., Cleveland 14, Ohio

HERCULES AUGERS

Hercules Augers

Ideal for modern high speed electric drills—withstands whips and torsional strains. Filler hard and tough as whalebone. Drills faster—drills more holes with resharpening—outlasts four to five ordinary drills. Recommended for the hardest jobs. Up to 3" diameters—up to 16 ft. in length.

Black Diamond Augers

Carefully made from high-carbon crucible grade steel—heat-treated to obtain as much hardness and toughness as possible, to prevent broken tangs and points. Furnished up to 2" diameters—maximum over-all lengths 16 ft.

Standard Augers

Originally developed for use with hand drills. These augers work best at hand drilling drilling holes under stumps, and ditch blasting. Up to 2" diameters from oval steel, 7/16" thick, and maximum length of ten ft.

Call on us for any type auger you may require in your operations. We specialize in manufacturing the better grade alloy, heat-treated augers. Write, wire or 'phone for details concerning sizes, prices, deliveries, etc.

SALEM TOOL COMPANY
SALEM OHIO

Anderson Jr. For the present the company will devote its entire time to research work for the anthracite industry in the development of heating equipment using the new basic principle of burning anthracite as recently announced by Anthracite Industries, Inc.

Guyan Machinery Co., Logan, W. Va., has appointed dealer representatives as follows: Union Supply Co., Denver, Colo.; Bluefield Hardware Co., Bluefield, W. Va.; Universal Supply Co., Beckley, W. Va.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has appointed J. H. Jewell as manager of industry departments.

Fred G. Teuful, district manager of the Storage Battery Division of Philco Corp. in Cleveland, has been named midwestern manager of the division, which includes supervision of offices in Buffalo, Pittsburgh, Cincinnati, Detroit, Chicago and Cleveland. He also becomes a member of the management staff at headquarters.

Reliance Electric & Engineering Co., Cleveland, announces the Reliance marine plant and Plant No. 2 are to be brought together as a self-contained marine division under Manager Karl H. Mayer. W. H. Haber is to be production manager of this division, in which henceforth will be concentrated the long-run manufacture of smaller equipment. Larger and more specialized equipment will continue to be produced at the main plant, now to be known as the Ivanhoe division. Appointed as manager of this division is Robert W. Cornell.

American Car & Foundry Co. announces that M. A. Cornish, superintendent, has been placed in full charge of the Carbondale (Pa.) plant and office.

Timken Roller Bearing Co., Canton, Ohio, has appointed A. F. Sprankle as metallurgical engineer in its steel and tube division.

Allis-Chalmers Mfg. Co., Milwaukee, announces that C. C. Van Zandt has been placed in charge of sales of the crushing, cement and mining section, and H. K. Swan heads the milling and oil-extraction and saw and pulp-mill sections.

Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill., a division of H. K. Porter Co., Inc., Pittsburgh, Pa., has appointed George Green as vice president in charge of sales. In the last year he served as railway sales manager of Elastic Stop Nut Co. and for the previous ten years was associated with Union Asbestos & Rubber Co., Chicago.

Lima Locomotive Works, Inc., Lima, Ohio, has appointed as vice president in charge of the shovel and crane division Henry Barnhart, formerly manager of the division. Albery Jay Townsend, chief mechanical engineer, has been named vice president in charge of engineering.

Walter A. Meyer, manager of dealer sales for the Allis-Chalmers Mfg. Co., has been elected president of the Multiple V-Belt Drive Association. He was vice

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CONTRACTORS

Mott Type "A" Oil Hydraulic 1500 Ft. Cap., 2¾" Diameter Core.

● Coal and all mineral properties tested—using our light gasoline drills. They save fuel and moving costs . . . guarantee satisfactory and proper cores.

Pre-pressure grouting for mine shafts . . . ground solidification for wet mine areas by our stop grout method. Water wells and discharge holes drilled and grouted . . . electric drills for inside mine drilling.

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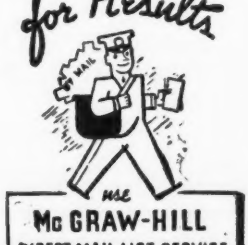
When planning your direct mail advertising and sales promotion, consider this unique and economical service in relation to your product. Details on request.



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A size for seams of any thickness
84A, 14" high, 7" lift
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5-tons capacity. Toe lift on all sizes
lifts from a minimum height of 1¾"

These Simplex Jacks have been widely adopted as general purpose mine jacks—for re-railing locomotives, trackwork and for lifting and moving mechanical equipment. Added safety is inbuilt. Features include double lever sockets, stronger cadmium plated springs and links, shorter fulcrum centers, larger toe lifts, stronger pawls and trunnion bearings, and reinforced inner-rib housings. Other automatic lowering lever jacks in 10, 15 and 20-ton capacities.

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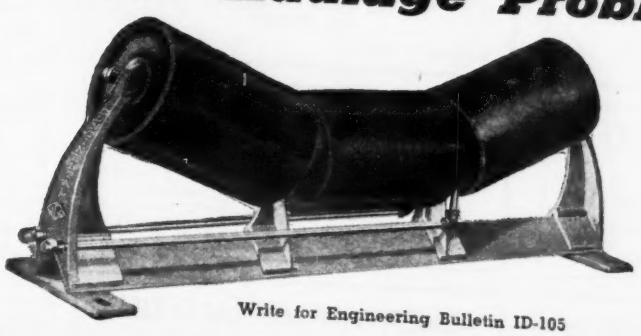

Write for Engineering Bulletin ID-105

INDUSTRIAL DIVISION
CONTINENTAL GIN COMPANY
BIRMINGHAM, ALABAMA
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president and chairman of the executive committee before his election as president. Other officers of the association are William D. Hamerstadt, Indianapolis, Ind., vice president, and A. B. Anderson, Chicago, secretary-treasurer.

H. B. Fuller Equipment Co., Cleveland, Ohio, has elected as president Sperry L. Searles, who has been active in the automotive field in that vicinity for 25 years. Since 1936 the Fuller company has been distributor in northern Ohio for the Easton (Pa.) Car & Construction Co.

Euclid Road Machinery Co., Cleveland, Ohio, has appointed the G. W. Van Kepperl Co., 2440 Pennway, Kansas City, Mo., as distributor in western Missouri and Kansas.

Mack Trucks, Inc., has appointed William P. Mitchell as assistant chief engineer.

Canton Stoker Corp., Canton, Ohio, has appointed these new factory representatives: Fletcher Sales Co. in Louisville, Ky.; Charles Bartels in Detroit; N. Colbert Co. in Indianapolis; Seltzer & Co. in Boston.

Philco Corp., Philadelphia, has appointed John F. Gilligan as advertising manager after 22 years' service with the company in the sales, advertising and order departments. The storage battery division in Trenton, N. J., has named William S. Hogg to its midwestern sales staff, with headquarters in Cincinnati but also covering the Louisville and Indianapolis areas.

•

Trade Literature

Speed Reducer—Link-Belt Co., 307 North Michigan Ave., Chicago. Book 1824, "A Complete Data Book on Worm Gear Speed Reducers for Industrial Applications," replete with halftones, dimensional line drawings, engineering data, horsepower ratings and tables of weights and dimensions, is aimed at helping to make selection of the type and size of reducer required for a specific service.

Circuit Breakers — I-T-E Circuit Breaker Co., 19th and Hamilton Sts., Philadelphia 30, Pa. Bulletin 4408, "Keeping Air Circuit Breakers in Trim," says an air circuit breaker, like any other machine, performs better and lasts longer when given reasonable care. Breaker won't stay closed? — Contact impression? What's that?—How much oil in the time-delay cups?—are a few of the questions answered.

Gas-Analysis Apparatus — Burrell Technical Supply Co., 1936-42 Fifth Ave., Pittsburgh 19, Pa. Folder gives advance showing of Burrell gas-analysis apparatus, with descriptions, lists of standard equipment and reagents recommended.

Diesel Generating Sets—R. H. Shepard Co., Hanover, Pa. Bulletin points out the ease and convenience of diesel generating sets, listing standard equipment with each unit. Another bulletin cites the advantages of diesel power for pumps.

Multiple V-Belt Drives—Multiple V-Belt Drive Assn., 140 South Dearborn St., Chicago. Booklet, "From the Shadoof to the Dominant Drive," is a thumb-nail history of man's effort to transmit power for his own benefit.

Mine-Car Dumping and Control Devices—Mining Safety Device Co., Bowerston, Ohio. Catalog describes complete line of standard Nolan products. Halftones, diagrams and brief text present all important details of Nolan cages, cagers, car hauls, car stops, cage landing chairs, car dumpers, dump feeders, retarders, safety horns, safety shaft gates, switches, trip feeders and trip makers.

Fuse Pullers—Trico Fuse Mfg. Co., 2948 North Fifth St., Milwaukee 12, Wis. Bulletin 5A illustrates and describes a handy tool for safely removing and replacing fuses, adjusting switch and fuse clips, handling test tubes, etc. Dangers of shocks, burns, lost time and compensation penalties are said to be eliminated. Made of horn fiber, laminated for extra strength and long wear, rolled sealed edges avoid moisture absorption. Also available in Bakelite for use where extreme moisture conditions exist or where an extremely fine tool is desired.

Cutting Tools—Robert H. Clarke Co., 9330 Santa Monica Blvd., Beverly Hills, Calif. Catalog 44 gives complete specifications and prices, as well as detailed descriptions, of the entire line of Clark adjustable cutting tools.

Rubber—B. F. Goodrich Co., Akron, Ohio. Leaflet tabulates the "Property Relation of Natural and Synthetic Rubber."

Industrial Equipment — Allis-Chalmers Mfg. Co., Milwaukee 7, Wis. Bulletin B6166C, covering products for the metal and non-metallic industries, gives a quick over-all picture, amply illustrated, of the following: blade mills, blowers, compressors, centrifugal pumps, concentration, control equipment, conveyors, converters, coolers, crushers, drives, dryers, feeders, furnaces, grinding mills, hoists, kilns, log washers, motors, power and electrical, pyro-processing, revolving scrubbers, roasters, screw washers, tractors, vacuum pumps, V-belts and vibrating screens. Features of design, operating principles and field experience are included.

Stokers—Canton Stoker Corp., Canton, Ohio. Bulletins show line of industrial stokers for all types of installations, large and small. No. 202 presents data and illustrations of installations of the Lo-Set ramfeed stoker designed for medium-sized industrial boilers. No. 203 outlines the advantages of the Vulcan heavy-duty ramfeed unit for severe industrial applications.

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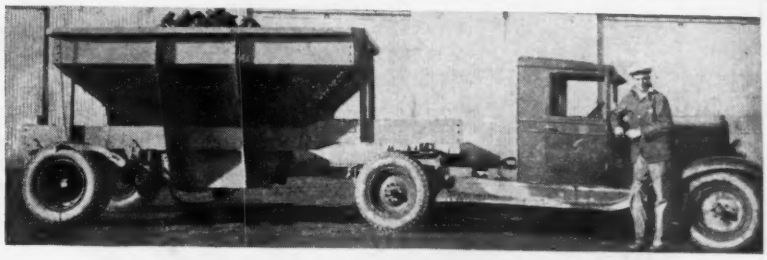
★Plan your future haulage now—with the advice of our engineers, men who know the haulage problems you face, and the kind of trailers best fitted to do it. Address your inquiry to United Iron Works Company, Pittsburg, Kansas.



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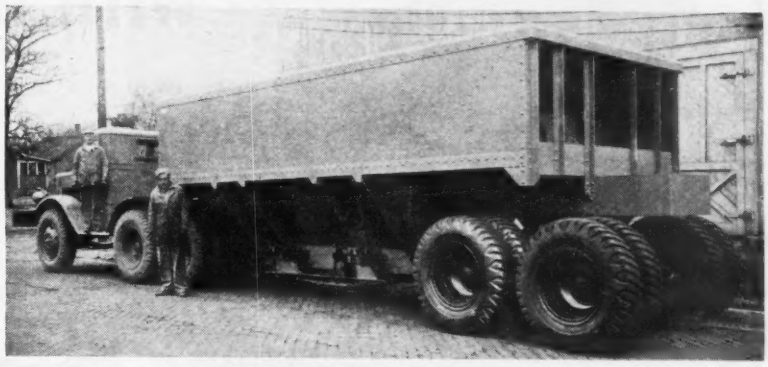

Years of experience brings you this new modern "United" Automatic Bottom Dump Semi-Trailer.

UNITED IRON WORKS COMPANY

Engineers - Founders - Manufacturers of Coal Mine Equipment

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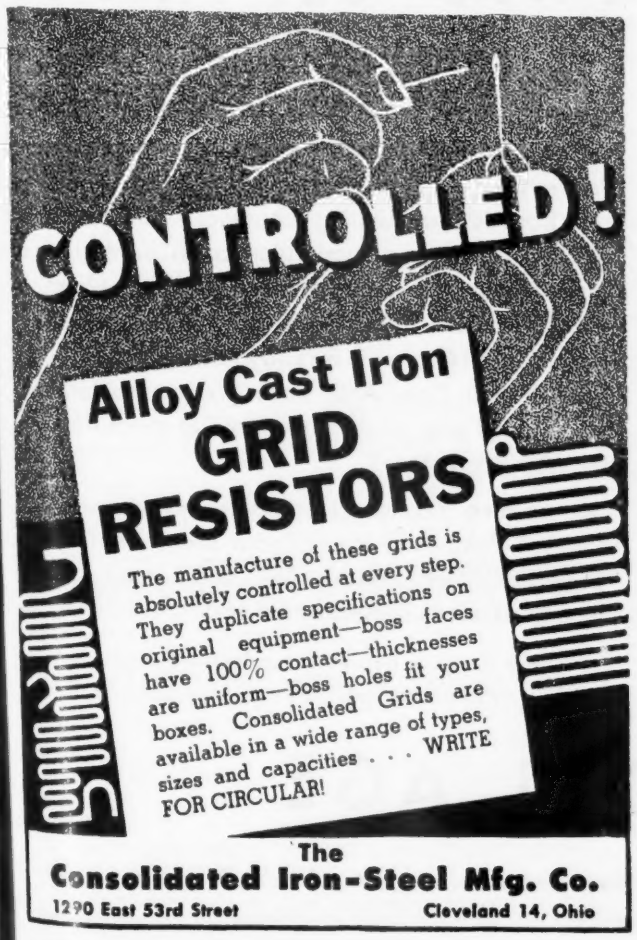

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Keep Your Plant's Quota "OUT FRONT!"

Victory depends upon materials—as well as men! To keep our American forces "closing in" overseas, you and every other manufacturer here at home must *keep on making* "Out Front" War Bond Quotas!

This means *action now* on *every* point in the fighting 8-Point Plan to step up Payroll Deductions. For instance, have you a 6th War Loan Bond Committee, representing labor, management and other important groups in your company? Selected Team Captains yet—preferably returned veterans? If so, have you instructed them in sales procedure—and given each the Treasury Booklet, *Getting the Order?*

How about War Bond quotas? Each department—and individual—should have one! Assigning responsibilities is vital, too! Have you appointed enough "self-starters" to arrange rallies, competitive progress boards and meeting schedules? Are personal pledge, order or authorization cards printed, and made out in the name of each worker? Planning for resolicitation near the end of the drive? Your State Payroll Chairman is ready now with a detailed Resolicitation Plan. And, have you contracted for space in *all* your regular advertising media to tell the War Bond story?

Your positive *Yes* to *all* points in this forward-to-victory 8-Point Plan assures your plant meeting an "Out Front" Quota in the 6th War Loan—and speeds the day of unconditional surrender!

The Treasury Department acknowledges with appreciation the publication of this message by

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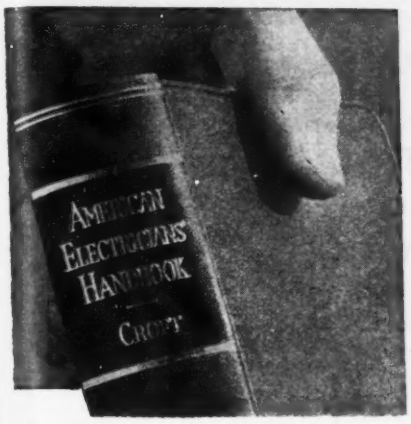

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—helps on installation, care, and proper loading of transformers.

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—new section of 64 handy wiring tables, conveniently arranged.

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It will pay you to investigate the 6 new features incorporated in the "Flood City" Car Spotting Hoist . . . an entirely new design in which a 30 to 1 worm gear reducer replaces old style cumbersome reduction.

These are the new features: (1) Special Emergency Brake. (2) Any Standard 5 H. P. Motor. (3) Rope pull 6,000 lbs. at 35 ft. per minute. (4) Special Ahlberg Ball Bearings. (5) Sealed-in-oil Reduction Gear Unit. (6) Heavy Channel Iron Frame with turned up ends to facilitate moving.

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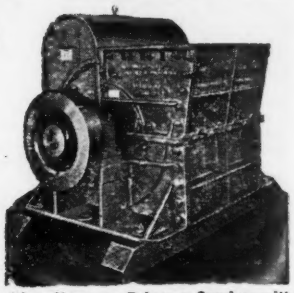

Ring Hammer Primary Crusher with patented tramp-metal catcher.

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Primary crushing of Bituminous mine run coal to 4" minus, capacity 5 Tons per hour, with the Gruendler Ring Hammer Crusher.

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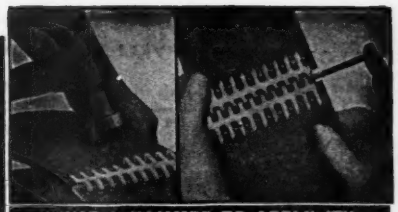

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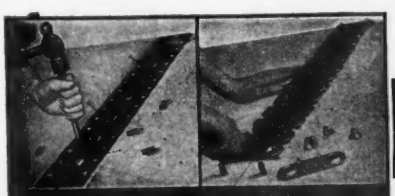
For conveyor and elevator belts of all thicknesses, makes a tight butt joint of great strength and durability. Compresses belt ends between toothed cupped plates. Templates and FLEXCO Clips speed application. 6 sizes. Made in steel, "Monel Metal", non-magnetic and abrasion resisting alloys.

By using Flexco HD Rip Plates, damaged conveyor belting can be returned to satisfactory service. The extra length gives a long grip on edges of rip or patch. Flexco Tools and Rip Plate Tool are used. For complete information ask for Bulletin F-100.

Sold by supply houses everywhere



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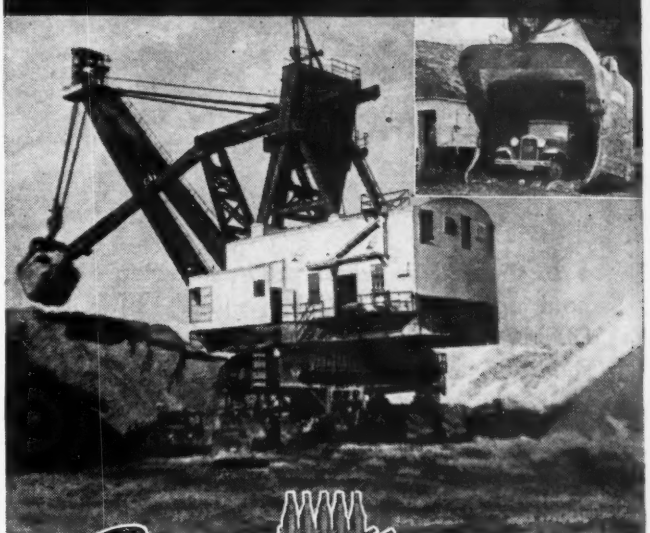

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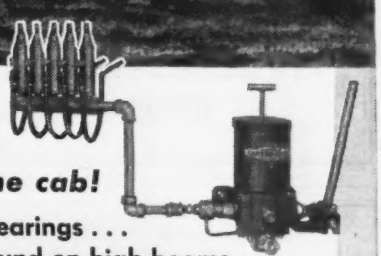

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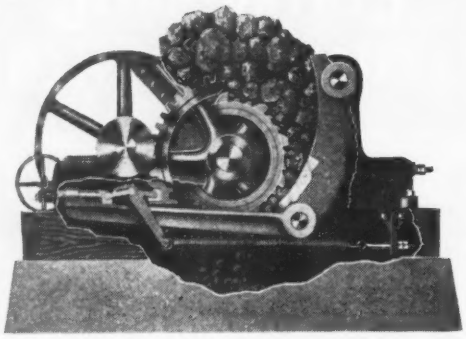

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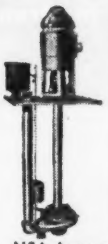

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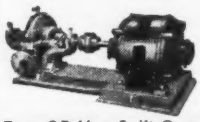

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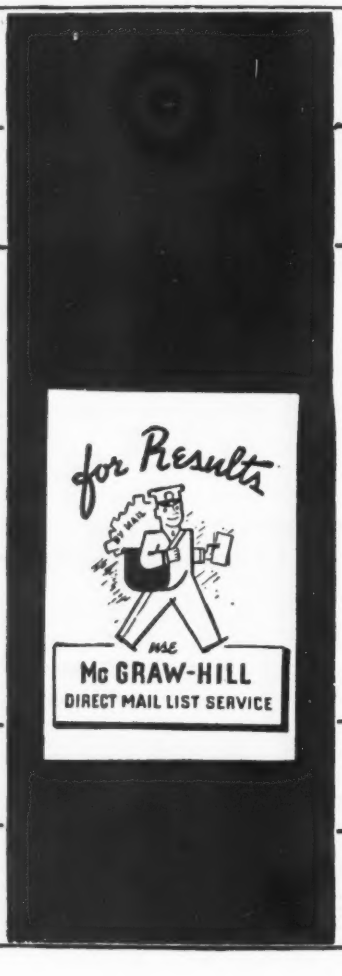

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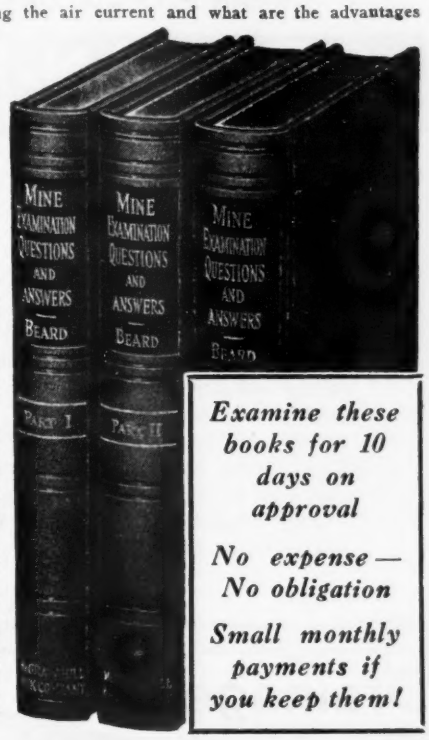

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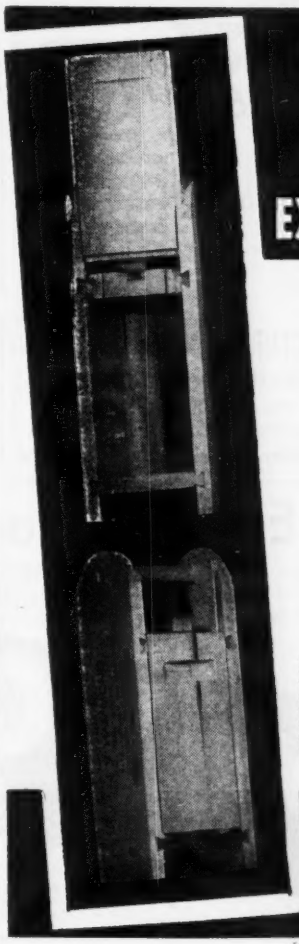

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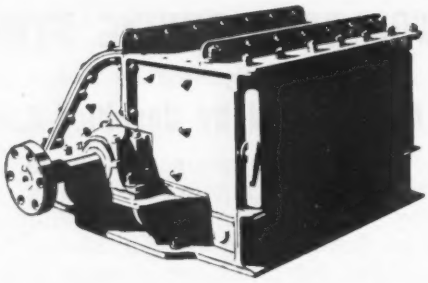

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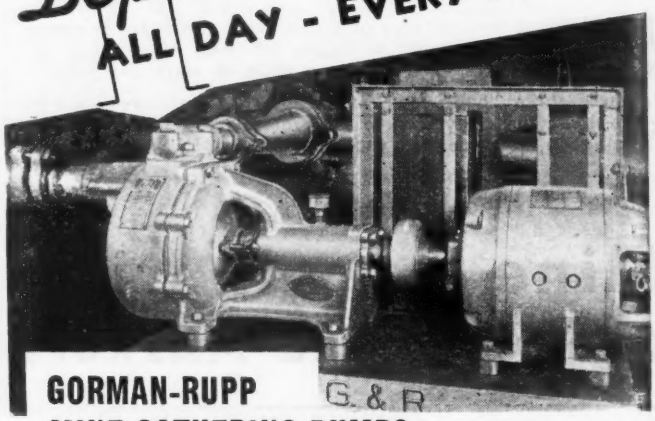

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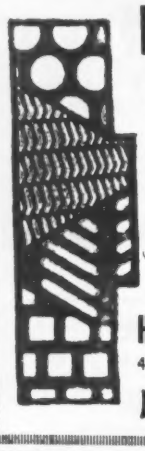

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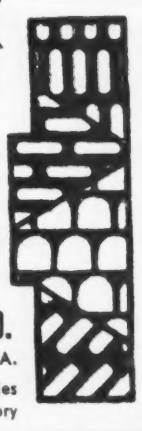

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(Continued on pages 180-183)

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1—Lidgerwood Two-Drum tail rope haulage hoist. Will coil 9000 ft. 1" rope. 300 HP Motor.
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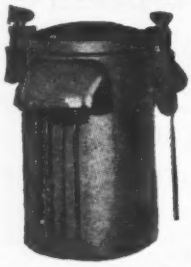
1—Wellman Haulage Band Friction. 96" drum 10,000 ft. 1¼" rope. 700 HP Electrical Equipment.

And other hoists to suit all mining conditions.

Jones Mining Equipment Co.
541 Wood Street, Pittsburgh, 22, Pa.

-TRANSFORMERS-



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We have several thousand transformers in stock for prompt shipment, and invite your inquiries.

PIONEER TRANSFORMER REBUILDERS

We rewind, repair and redesign all makes and sizes.

One Year Guarantee

THE ELECTRIC SERVICE CO., INC.
"AMERICA'S USED TRANSFORMER CLEARING HOUSE"
STATION M Since 1912 CINCINNATI 27, OHIO

HOISTS

1—Ottumwa double drum, single gear reduction Electric Shaft Hoist, complete, in first-class condition, with 60 horsepower, 600 revolutions, 220 volt, 3 phase, 60 cycle General Electric motor.

LESLIE E. BRYANT
Clarksville, Arkansas

FOR SALE

1—30" Troughing Belt Conveyor, 640' centers, Jeffrey Ball Bearing idlers, 5-ply rubber covered belt, 30 HP Motor and speed reducer. All excellent condition. Located in Indiana. Inspection invited.

Consolidated Products Co.
Incorporated
13-21 Park Row, New York 7, N.Y.

LOCOMOTIVES

1—6-Ton Gas Locomotive, 36" Ga., Milwaukee Locomotive Works
1—6-Ton Gas, 36" Ga., Whitcomb
1—8-Ton 0-4-0 Vulcan, S/G Ex. Cond.
2—25-Ton 0-4-0 Porter Saddle Tank Locos. Oil Burners: A.S.M.E. Code, Excel. Cond.
2—43-Ton Baldwin-Westinghouse Electric Locomotives, 600 volt D.C.
1—50-Ton 0-6-0 Vulcan Locomotive
1—60-Ton Westinghouse Electric, 550 V. D.C.
1—65-Ton 2-6-0 Mogul Loco. Oil-burning
1—70-Ton 0-6-0 Baldwin Switching ICC cond.
1—70-Ton Baldwin-West'se El. Loco., 600 V. D.C.
1—70-Ton Gas-Electric Locomotive
1—70-Ton G.E. Battery Electric. Excel. cond.
1—88-Ton 0-6-0 Lima Switching. Excel. cond.
Other Locomotives, Too

IRON & STEEL PRODUCTS, INC.
39 years' experience
13484 S. Brainard Ave., Chicago 33, Ill.
"ANYTHING containing IRON or STEEL"

Davenport, Porter, Vulcan 18 to 20 ton steam 36" gauge S/T locomotives, (4), rebuilt, tested.
Vulcan 18-ton steam S/T locomotive, 42" gauge.
Plymouth and Milwaukee gas locomotives, 8, 12, 25, 35 tons; 35" and std. ga., A-1.
Porter 52-ton steam S/T locomotives, (2), std. ga.
Bucyrus 50B, 80B steam shovels & Diesel cranes.
Monighan 3-yd. electric Walking dragline.
Euclid 6-yd. bottom dump crawler wagons (8).

H. Y. SMITH CO.
828 N. Broadway Milwaukee 2, Wis.

FOR SALE

1—Goodman Shaker Conveyor, Mod. G-20
1—Sullivan Conveyor Short Wall, Mod. 10B
Above machines operate on direct current
1—C.L.U. Track Cutter, AC current
1—LeRoi Portable Compressor, 105 cu. ft.

SURMI MINES, INC.
Box 1405 Great Falls, Mont.

SEARCHLIGHT SECTION

16 YD. DRAGLINE:
1—16 Yd. Electric Caterpillar Modern Dragline with 160' Boom
AIR COMPRESSORS:
(7) Steam 66 ft., 300 ft., 600, 1000 & 1940 ft.
(12") Belted, 360, 676, 870, 10000, 1300 ft.
(13) Diesel 105, 315, 520, 676 & 1000 ft.
(6) Electric, 1300, 1500, 2200, 2000, 5000 ft.
(14) Gasoline, 10, 160, 220, 310 & 370 ft.
RUBBER CONVEYOR BELTS:
1000' 60", 600' 30", 300' 20", 1000' 42", 900' 48", 1450' 36", 1200' 24", 900' 18", 600' 16", 350' 14"
TANKS:
12,000 and 15,000 gal. and 20,000 gal.
CONVEYOR PARTS:
Idlers, Heads & Tail Pulleys, Steel Frames, Tripper, etc., 14 In., 16 In. Large stock here.
STORAGE BATTERY LOCOMOTIVES:
2½ ton Whitcomb 24 ga. New Batteries
2—4 ton G.E. 30 in. ga.
2—5 ton Mancha 30 in. ga.
4—5 ton G.E. 36 in. ga.
3—7 ton Goodman 36 ga. Battery & Trolley
8—6 ton Baldwin Westgh. 42 ga. & 36 ga.
TRACK SCALE:
150 Ton Buffalo 56 ft. R.R. Track Scale
TROLLEY LOCOMOTIVES:
2½ ton Westinghouse 24 ga.
4—6 ton & 2—5 ton Goodman 36 ga.
3—6 ton Goodman 30 ga.
4—6 ton Goodman 42 ga.
5—6 ton Westinghouse 42 ga.
2—8 ton Goodman 36 ga.
10 ton Goodman 42 ga. & 13 ton Jeffrey
VIBRATING SCREENS:
9 Tyler Hummer 3x6, 4x5, 4x8, 4x10
2 Robins Gyrex 4x8½
4x12 Niagara, 3x8 L. B., 5x6 Simplex
CARS:
60—Western 16-20-30 yd. Side Dump
SHOVELS, CRANES & DRAGLINES:
2 yd. Monighan 60' Boom Walker
2—1¼ Marion Diesel Elec. Shovels
2 yd. P. & H. Model 780 75' Boom Diesel Dragline
1 yd. K 30 Link Belt 50' Boom Crane
2 yd. Page 70' Boom Diesel Dragline
1¼ yd. Marion 450 Elec. Shovel
1½ yd. Lima Diesel Shovel & Dragline
25 ton Browning 50' Boom Loco. Crane
MINE LOADERS:
Junior Joy 36 ga. Low Pan
3—5 BU & 7 BU & 12 BU 36 or 42 ga. Joy
7 Conway 20A, 30A, 50A, 60 & 75 Muckers
5—Gardner Denver & Elmco Shovels
MISCELLANEOUS:
5'x60' Traylor Rotary Dryer
Clamshell Buckets ¾; 1, 1½ & 2 yd. Cap.
30 ton & 12 ton Vulcan St. Ga. Gas. Loco.
WANTED TO BUY:
Complete Mines—M.G. Sets, Locomotives, Compressors, Conveyors, Cranes, Crushers, Mine Loaders

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60 East 42nd St. New York, N. Y.

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24"x18' Lodge & Shipley, M.D.
32" x 20' Boye & Emmes, Cone Drive, Quick change.

RADIAL DRILLS

6' American Triple Purpose, M.D.
6' Cincinati Bickford Radial M.D.
7' Cincinnati Bickford Radial M.D.

CINCINNATI MACHINERY & SUPPLY COMPANY
218 E. Second St., Cincinnati, Ohio

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New and Used

Large stocks, all sizes
attractive prices

L. B. FOSTER COMPANY
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STEEL TANKS—STEEL BUILDINGS

All sizes and kinds
Guaranteed used steel pipe
Valves and fittings
All items at various points

JOS. GREENSPON'S SON PIPE CORP.
Natl. Stock Yds., St. Clair Co., Ill.

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150 KW MOTOR GENERATOR SET

250/275 V. D.C.—3/60/2300 V. A.C.
SK—WESTINGHOUSE—G
ARMATURE REWOUND—ALL REBUILT
COMPLETE PANEL CONTROL

JOHN D. CRAWBUCK CO. PGH. (22) PA.

FOR
IMMEDIATE DELIVERY
OF
RUBBER PRODUCTS

Conveyor Belting...Transmission Belting...Elevator Belting...Fire, Water, Air, Steam, Suction or Welding Hose, etc.

CALL, WIRE or WRITE
CARLYLE
THE RUBBER HEADQUARTERS

CARLYLE RUBBER PRODUCTS ARE NEW, GUARANTEED & LOW PRICED

CONVEYOR BELTING

ABRASIVE RESISTANT COVERS

Width	Ply	Top-Bottom	Covers	Width	Ply	Top-Bottom	Covers
48"	8	1/8"	1/16"	20"	5	1/8"	1/32"
42"	5	1/8"	1/16"	20"	4	1/8"	1/32"
36"	6	1/8"	1/16"	18"	4	1/8"	1/32"
30"	6	1/8"	1/16"	16"	4	1/8"	1/32"
30"	5	1/8"	1/16"	14"	4	1/16"	1/32"
24"	5	1/8"	1/32"	12"	4	1/16"	1/32"
24"	4	1/8"	1/32"				

Inquire For Prices - Mention Size and Lengths

TRANSMISSION BELTING

HEAVY-DUTY FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	6"	5
16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

Inquire For Prices - Mention Size and Lengths

ENDLESS "V" BELTS

"A" WIDTH All Sizes | "D" WIDTH All Sizes
"B" WIDTH All Sizes | "E" WIDTH All Sizes
"C" WIDTH All Sizes | Sold in Matched Sets

Inquire For Prices - Mention Size and Lengths

PROTECT THAT PLANT
FIRE HOSE

APPROVED SPECIFICATION HOSE
EACH LENGTH WITH COUPLINGS ATTACHED

Size	Length	Per Length
2½"	50 feet	$28.00
	25 "	16.00
3"	50 "	23.00
	25 "	13.00
1½"	50 "	20.00
	25 "	11.00

Specify Thread On Couplings

SPECIAL OFFER . . . HEAVY DUTY
RUBBER HOSE

WATER HOSE
Each Length with Couplings Attached

I.D. Size	Length	per Length
¾"	25 feet	$4.25
1"	50 "	8.00
	25 "	6.25
1¼"	50 "	12.00
	25 "	7.50
	35 "	10.50
	40 "	12.00
1½"	50 "	15.00
	25 "	10.00
	35 "	14.00
	50 "	20.00

AIR HOSE

I.D. Size	Length	per Length	Couplings
½"	25 feet	$5.00	$1.50 Pair
	50 "	10.00	1.50 "
¾"	25 "	6.25	2.50 "
	50 "	12.50	2.50 "
1"	25 "	10.00	3.50 "
	50 "	20.00	3.50 "

LARGER SIZES ALSO AVAILABLE
All Prices—Net—F.O.B. New York

CARLYLE RUBBER CO., INC.
62-66 PARK PLACE NEW YORK, N. Y.

PIPE—MACHINERY—GAS ENGINES
AIR COMPRESSORS—DIESELS—PUMPS

Some Steam Engines and Boilers available only slightly above the metal price.

BRADFORD SUPPLY COMPANY
WAYNE, WOOD COUNTY, OHIO Near Toledo

PIPE New & Reconditioned

ALL SIZES for ALL PURPOSES
Cut and Threaded to Your Specifications
VALVES AND FITTINGS
UNITED PIPE & SUPPLY CO., NORRISTOWN, PA.

PROMPT SHIPMENT FROM OUR WAREHOUSE

MINING MACHINES

5—12 DA 50 HP 250 v. Goodman Shortwall
35 B Jeffrey 250 v. 6' cutter
2—29 C Jeffrey 250 v. Top Cutters
3—Low Vein Sullivan CR-2 (250 v.)
12 A Goodman 250 v. 36" Ga. 35 HP

STORAGE BATTERY LOCOMOTIVES

2—6 Ton G.E. Permissible Locomotives 36/44" Ga. O.S. armorplate frame. Inside steel tired wheels. 2-HM 825 Ball Bearing Motors. Type LSBE Class 2C6 From C9. 13½' long, 50" high, 69" wide and 44" Wheel base.

Each of the above units equipped with Edison Battery 80 cell A-10—one new in 1940, the other in 1939.

2—5 to 5¼ Ton Type D Ironton, 36 or 42" Ga. Low Type, with Exide Battery.
1—5 Ton Atlas 40" or 44" Ga. with 2 Ball Bearing Motors. Battery box on top of locomotive.
4 Ton 36" Ga. Atlas, with Exide Battery.
4 Ton 36" G.E. (2 motors), with Exide Battery.

(Haulage)

13 Ton Westgh. 250 V. 36" or 40" Ga.
10 Ton Jeffrey 500 v. 36/42" Ga.
6 Ton Westgh. 500 v. 42" Ga.
1—5 Ton West. 250 V. 36 or 42" Ga. with Electric Gathering Reels. Bar steel frame.
6 Ton Baldwin West. 250 v. 36/42" Ga. #48747 904 Motors outside bar steel frame, inside steel tired wheels.

SCREENS

2—4' x 5' single deck Tyler Hummer Screens Type 37 equipped with V-16 Vibrators No. 2860 and 2867 designed for 110 v. AC 15 cy.

MG SETS 3 ph. 60 cy. (Syn.)

150 KW G.E. 250 v. —2200/3/60 900 RPM.
100 KW Chandevsson 150 v. DC—2300/3/60 AC Syn.
100 KW Ridg—250 v. DC—2200/3/60 AC 1200 RPM..
100 KW West. 125 v. DC—2200/3/60 AC 1200 RPM

COAL CRUSHERS

18" x 24" Double roll New.
18" x 30" Double roll New.

ENGINE GENERATOR & TURBINE SETS

100 KW 250 V. DC Westgh.—Skinner Engine
57.5 KVA Allis Chalmers Gen. 220/3/60—Kerr Turbine

SLIP RING & SQ. CG. MOTORS (3 ph. 60 cy.)

HP	Make	Speed	Wdg.	Type
500	G.E.	450	S.R.	MT 412
200	G.E.	250	S.R.	MT 412
200	G.E.	600	S.R.	I-M
150/75	West.	580/290	S.R.	CW
150	West.	375	S.R.	CW
150(2)	West.	600	S.C.	CCL
125	Al. Ch.	435	S.R.	
100	G.E.	500	S.R.	MI-25 cy.
100	Al. Ch.	575	S.R.	
100	G.E.	1200	S.C.	
100	West.	690	S.R.	CW
75	West.	290	S.R.	CW
75	West.	850	S.C.	CCL
40	West.	575	S.C.	CS
50	G.E.	900	S.R.	IM

Other sizes down to 1 HP

SYNCHRONOUS MOTORS

HP	Make	Voltage	Speed	Type
200	West.	2200	900	
150	G.E.	2200	900	ATI

Each of the above has a dir. con. exciter

CAPACITOR

180 KVA 2200/3/60 Type OH1 3 ph. 60 cy.

DC GENERATORS

150 KW West. Type S. 250 v. 450 RPM
75 KW G.E. DLC 125 v. 700 RPM
65 KW G.E. CL 250 v. 1000 RPM
50 KW West. 250 v. 900 RPM

PUMPS

250 GPM 250# or 575' Head 2 cyl. Hor. National Transit 6" suc. 4" dis. enclosed driven by 40 HP Motor.
250 GPM 275' Head Worthington, 4" suc. 3" dis. driven by 30 HP 230 v. DC Motor.

HOISTS

800 HP Vulcan Slope Hoist with AC Motor and Control
500 HP Connellsville Sgl. drum slope Hoist complete with AC Motor and contactor control.
100 HP Vulcan Hoist drum 42" dia. 36" face, 9" flanges driven by 100 HP G.E. slip ring motor.
75 HP Lidgerwood sgl. fr. drum
50 HP Diamond 2 drums same Shaft
30 HP Clyde sgl. drum AC Motor
30 HP Double drum—Tandem
15 HP Lidgerwood sgl. dr. AC Motor

400 TRANSFORMERS

Qu.	KVA	Pri. V.	Sec. V
31	7½	"	"
28	10	"	"
2	25	2200	244/488
3	50	22000	2200
1	37½	2400	230/115

MOORHEAD-REITMEYER CO., INC.

PITTSBURGH, PENNSYLVANIA

ROTARY CONVERTERS

500 KW AL-CH SYN 275 V. 6 Ph., 60 Cy., 1200 RPM. Pedestal Type, 2300/4000 V., Transformers.
500 KW WEST. SYN 275 V. 6 Ph., 60 Cy., 1200 RPM. Pedestal Type, 2300/4000 V., Transformers.
300 KW G.E. SYN 575 V. HCC, 6 Ph., 60 Cy., 1200 RPM, form P, 2300/4000 V. Transformers.
150 KW WEST. SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM, Bracket Type, 2300/4000 V. Transformers.

MOTOR GENERATORS

500 KW WEST. SYN. 275 V. 2300 V. 3 Ph., 60 Cy., 900 RPM, Manual Switchgear.
300 KW G.E. SYN. 275 V. 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM, Manual Switchgear.
200 KW G.E. IND., 600 V., 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM. Manual Switchgear.
200 KW R.W. SYN., 275 V., 2300/4000 V., 3 Ph., 60 Cy., 900 RPM. 80% P.F. Manual Switchgear.

LOCOMOTIVES

13-T WESTGHE., 250 V. 908-C Mts., 36" Ga.
13-T GOODMAN, 250 V., 36-A Mts., 36"-42" Ga.
10-T WESTGHE., 250 V., 907-C Mts., 36"-44" Ga.
10-T WESTGHE., 500 V., 907-C Mts., 36"-44" Ga.
8-T WESTGHE., 250 V., 906-C Mts., 36"-44" Ga.
8-T WESTGHE., 500 V., 906-C Mts., 36"-44" Ga.
8-T GEN. ELEC., 250 V., 839 Mts., 36"-48" Ga.
6-T WESTGE., 250 V., 904-C Mts., 36"-48" Ga.
6-T GEN. ELEC., 250 V., 823-A Mts., 36"-44" Ga.

Each unit listed above is owned by us and is available now for immediate purchase.

WALLACE E. KIRK COMPANY

Incorporated

501 Grant Building Pittsburgh, Pa.

DORR CLASSIFIERS

3—Dorr Bowl Classifiers
10' dia. bowl with 2'3" x 19'8" rake,
12' dia. bowl with 2'3" x 21'4" rake,
15' dia. bowl with 2'3" x 23' rake.

Consolidated Products Co., Inc.

13-21 Park Row, New York City, N.Y.

FOR SALE

Link Belt K 480 Diesel Dragline 2 yd. cap.
Buc.-Erie 42B steam shovel 1½ yds. cap.
Browning 10-12 ton truck crane on Mack truck
Marion 371, 1¾ yard Shovel-Crane-Dragline
P & H 650 Shovel and Crane
Buc. Erie GA-2 Shovel, gas
General ½ yd. Diesel Crane
P & H 250 Truck Crane, 16½ tons
P & H 203A Truck Crane, 8 tons
Lorain 45 Crane-Shovel, ¾ yd.
Conway Mucker "75", 36" gauge
2—Conway Muckers "50", 36" ga. rebuilt
Buc. Erie 50B Steam Shovel 2 yds.
Marion Model 37 Steam Shovel, 1¾ yds.
Koehring 301, ¾ yd. Shovel & Crane
Buc. Erie Steam Dragline, 6-8 yds. 175' bm.
Ind. Brownhoist Crane, gas, 40' boom, 1 yd.
Allis Chalmers HD 14 Tractor with bulldozer
Int. TD 18 tractor with angledozer
Allis Chalmers HD10 Tractor with bulldozer
Allis Chalmers LO Tractor with bulldozer
Allis Chalmers "K" Tractor with bulldozer
Int. T35 Tractor with Angledozer
Allis Chalmers "30" Tractor with bulldozer
Jaw Crushers: 12x26, 13x30, 14x28, 16x32
Gyratory Crusher, Superior-McCully 30"
Gyratory Crusher, Traylor Type T, 12"
Mundy 35 H.P. double drum gas Hoist
National 100 H.P. dbl. drum Dragline Hoist, elec.
Baldwin 78 ton Side Tank Locomotive
American 45 ton Saddle Tank Switcher
Vulcan 30 ton Steam, std. gauge Saddle Tank loco.
Vulcan 25 ton Steam Loco. std. ga., side tank
Whitcomb 14 ton, 36" gauge Diesel Loco.
Vulcan 6 ton, 36" gauge, gas Locomotive
15—Gondola Cars, 50 tons, steel
Haiss Model 206 wagon loader 3 tons per min.
Haiss Model 16 wagon loader Cat. type
Haiss 30' scraper conveyor wagon loader
Trucks: Mack, Sterling, G.M.C. up to 12 yds.
Pumps—Gas, Electric, Steam, large stock
I. R. 1302 CFM., 2 stage Air Compressor
Bucket elevator, belt, 22", buckets, 35'
Haiss ¾ yd. Clam. rehandling Bucket
Erie ¾ yd. Clam. rehandling Bucket
Blaw-Knox ⅞ yd. Clam. digging Bucket
Hayward ⅞ yd. Clam. digging Bucket

RICHARD P. WALSH CO.

30 Church St. New York 7, N. Y.

SHOVELS—DRAGLINES

2—120B Bucyrus Erie Elec. 80 Ft. Dragline Boom, 5 Yd. Bucket & 32 Ft. Shovel Boom 4¾ Yd. Bucket.
2—2½ Yd. 48B Bucyrus Erie Diesel Shovels & 60 Ft. Boom Draglines.

36 IN. CONVEYOR EQUIP.

800 Anti Friction Troughing Idlers
300 Anti Friction Return Idlers
1500 Ft. 6 Ply Conveyor Belt.

DIESEL TRUCKS

18—Mack-Cummins 10 Yd. Steel Body Dump Trucks.

R. C. STANHOPE, INC.

60 East 42nd St. New York, 17, N. Y.

FOR SALE

McNally Pittsburg Washer complete Mine machinery—AC Cutting Machines, Loading Machines, Drills, 5 DC Haulage Motors, Two Battery Locomotives, 127—36 inch gauge Roller Bearing Mine Cars, Head Frame, Hoist, Rails, Pumps, Motor Generator Set, Transformers, Wire, Cables, etc.

S. A. DOBBS

808 Chemical Bldg., St. Louis 1, Mo.

RAILS NEW AND RELAYING

TRACK ACCESSORIES from 5 Warehouses

- PROMPT SHIPMENTS
- FABRICATING FACILITIES
- TRACKAGE SPECIALISTS

EVERYTHING FROM ONE SOURCE

L. B. FOSTER COMPANY

PITTSBURGH • CHICAGO • NEW YORK

1—Flory Hoist 200 H.P. 440 volts. 60 cycles, air brakes, duty 12,000 lbs. @ 600 F.P.M.
2—Sullivan CR 2 shortwall machines 250 volts, DC. 50 H.P.
1—Sullivan CE 9 longwall machine 440 volts A.C.
2—Goodman 412 shortwall machines 440 volts A.C.
3—Jeffrey 24 B longwall machines 250 volts D.C.
1—Jeffrey 35 L—Shortwall Machine 250 volts D.C.

BERRETTINI ELECTRIC CO.

376 N. Main Street Plains, Pa.

M. G. SETS

2—Westinghouse 300 KW Synchronous 3 phase, 60 cycle, 2200 volt. 550-600 Volt D.C. 720 R.P.M. with switchboard.

JONES MINING EQUIPMENT CO.

541 Wood Street Pittsburgh 22, Pa.

RELAYING RAILS

and accessories

Immediate Shipment

MIDWEST STEEL CORPORATION

CHARLESTON WEST VIRGINIA

RAILS—CARS

All sections of rails and good serviceable second hand cars, all gauges, also spikes, bolts, frogs, switches and ties.

M. K. FRANK

No. 6 Blitz Bldg. Reno, Nevada
New York, N. Y.

810 Park Bldg., Fifth Avenue Pittsburgh, 22, Pa.
Carnegie, Pa.

REBUILT EQUIPMENT—READY TO SHIP

MOTOR GENERATOR SETS

1—35 kw. 1150 rpm. 250 v. DC Gen. dir. conn. to 50 HP 240/480 v. 3 ph. 60 cy. 1200 rpm. Cr. Wh. Syn. Motor.
1—150 kw. 250 v. 900 rpm. Gen. direct driven by Westinghouse Syn. Motor.
1—200 kw. West. 600 v. DC 900 rpm. Gen. direct driven through common shaft by 1—290 HP 440 v. 3 ph. 60 cy. West. Syn. Motor.

ROTARY CONVERTERS

3—150 kw. West. 3 ph. 60 cy. 275 v. 1200 rpm. Rotary Converters complete with transformers and switchboard.
3—300 kw. West. 3 ph. 60 cy. 600 v. 1200 rpm. Rotary Converters complete with transformers and switchboard.

DIESEL ENGINE GENERATOR SET

1—150 kw. 250 v. 200 rpm. cp. wd. Cr. Wh. Gen. dir. conn. to 260 HP 200 rpm. 2 cyl. Buckeye Diesel Engine.

MINING MACHINES—250 v. DC

1—CE-7 Sullivan 36" ga.
1—Armature for CE-7 Sullivan 250 v. DC.

MINE LOCOMOTIVES

4—5 ton Goodman 30 B. 250 v. 36" ga.
1—5 ton Goodman 2600R Gathering Locomotive, 250 v. DC 42 or 44" ga. with cable reel.
2—7 ton Goodman 32-0-4-T 250 v. 36" ga.
1—10 ton West. 500 v. 40" ga.
1—10 ton Goodman Locomotive, 250 v. 42" ga. cast iron frame, inside wheels.
1—13 ton Westinghouse 42" ga. 250 v. Locomotive, cast iron frame, two motor type, single end control.

CENTRIFUGAL PUMPS

1—1000 GPM Cameron bronze, 100' hd.
2—American Piston Pumps, intake 5½", discharge 4½", size 8x12.

SLIPRING MOTORS—3 ph. 60 cy.

HP	Make	Type	Volts	RPM
300	G.E.	I	440	900
260	Burke	EMV-65	440	600
150	West.	CW	220/440	490
150/75	West.	CW	220/440/2200	580/290
100	West.	CW	220/440	720
75	G.E.	I-M	440	1200
75	West.	CW	220/440/2200	580/290
50	Chand.		220/440	1800
50	Allis Chal.		220	490
50	G.E.	OM-7	220/440	1160/560
20	Westg.	CW	220	1735
15	Westg.	CW	220	870

230 V. DC Motors

HP	Make	RPM	Type
¾	Cr. Wh.	850	EL
1	Louis Allis	1150	INA
1½	Westg.	2200	SK
1½	Westg.	1000	CD
1½	Westg.	900	SK
1½	Robbins Myers	1750	
2	Thompson	1100	
2	Northern	1000	
4	Westg.	1180	
4	Cr. Wh.	1170	CM
5	Cr. Wh.	960	CCM
5	Cr. Wh.	980	CM
5	Imperial	510	SK
5	Westg.	850	
5	Westg.	1600	RC
7½	Cr. Wh.	875	
7½	Westg.	425	SK
7½	Cr. Wh.	875	
7½	Cr. Wh.	940	CCM
10	West.	1325	S
10	Cr. Wh.	875	
10	Cr. Wh.	825	CM
10	Cr. Wh.	675	CCM
10	Allis Chal.	1200	
15	G.E.	850	RC
15½	West.	965	S
35	G.E.	900	DLC

TRANSFORMERS—1 ph. 60 cy.

No.	Kva	Pri.	Sec.	Make
1	2	6600	110/220	G.E.
3	5	2300	220/440	G.E.
1	5	550	110	Pgh.
1	5	2200	110/220	West.
84	7½	2200	220/110	G.E.
32	7½	2200	220/110	West.
12	10	2200	220/110	West.
13	10	2200	220/110	G.E.
2	15	400/30000/50000		American
1	25	2200	220/110	G.E.
6	35	220	110	West.
3	37½	2200	440/220	West.
3	50	6600	575/440/220	G.E.
2	50	6600	550/440	Pgh.
2	50	6600	550/440	Al. Ch.
6	73	2200/4000	220/110	West.
6	73	440	205	West.
1	75	2200	220	Burke
6	75	2200	220/440	West.

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1—300 Amp. 275 volts, type RBI, serial No. 6193.
1—400 Amp. 275 volt, type CRL, serial No. 6327.
1—400 Amp. 275 volt, type ARL, serial No. 7530.
1—600 Amp. Class I, type AHD, 275 v. Ser. No. 8051.

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ELECTRIC LOCOMOTIVES

1—10 Ton G.E. steel frame, 250 v., H.M. 830-A Motors.
1— 8 Ton Goodman, steel frame, 250 v., type 3104-T, 42" track gauge.
1— 6 Ton Jeffrey, with MH 88, 250 v. Motors and reel.
1— 6 Ton West, bar steel frame with 904-C, 250 V. Motors.
1— 5 Ton G. E. ready to operate, 42" gauge.
2—5 Ton Goodman, 250 V., 36" gauge.

COAL CUTTING MACHINES

1—35 B Jeffrey, 250 V.
1—35 BB Jeffrey, A.C.
1—124 EJ Goodman, 50 Hp, 250 V., Permissible track mounted slabbing machine.
1—12 DA Goodman, 50 Hp, 250 V., D.C.
1—12G3 Goodman shortwall, 3/60/220 V.
1—12 AB Goodman shortwall, 250 V., D.C.
1—36 B Jeffrey, 250 V., longwall.
1—90L Goodman Elevating Conveyor.

MISCELLANEOUS

1—100 KW West, compound wound D.C. generator, 250 V.
1—100 KW Rotary Converter, 275 V., D.C.
1—165 HP G.E. Syn. 2200 V., 900 RPM Motor.
1—15 Hp G.E. ball bearing 3/60/220 Motor.
1—42" x 36" Ottumwa Hoist with 100 Hp Motor.
1—42" diameter x 33" face Ledgerwood Hoist with 125 HP Motor.

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Pittsburgh 13, Pa.

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10, Hopper, Side-Discharge, 50-Ton
90, Refrigerator, 40-Ft., 40-Ton
16, Refrigerator, 36-ft., 30-Ton
10, Ballast, Composite, 50-Ton
25, Box, 36-Ft., 40-Ton
4, Dump Koppel Automatic, 30-Yd., 50-Ton.
4, Dump, Western, 20-Yd., 40 & 50-Ton
1, Dump, Koppel, Drop-Door; 20-Yd., 40-Ton
18, Dump, K & J Automatic, 16-Yd., 40-Ton
20, Flat, 40-Ft., 40 and 50-Ton
35, Gondola, Composite, 36-Ft. & 40-Ft., 40 & 50-Ton.
9, Gondola, Steel, 50-Ton, High-Side
30, Tank, 8000-Gallon, 40 & 50 Ton
10, Tank, 10,000-Gallon, 50-Ton

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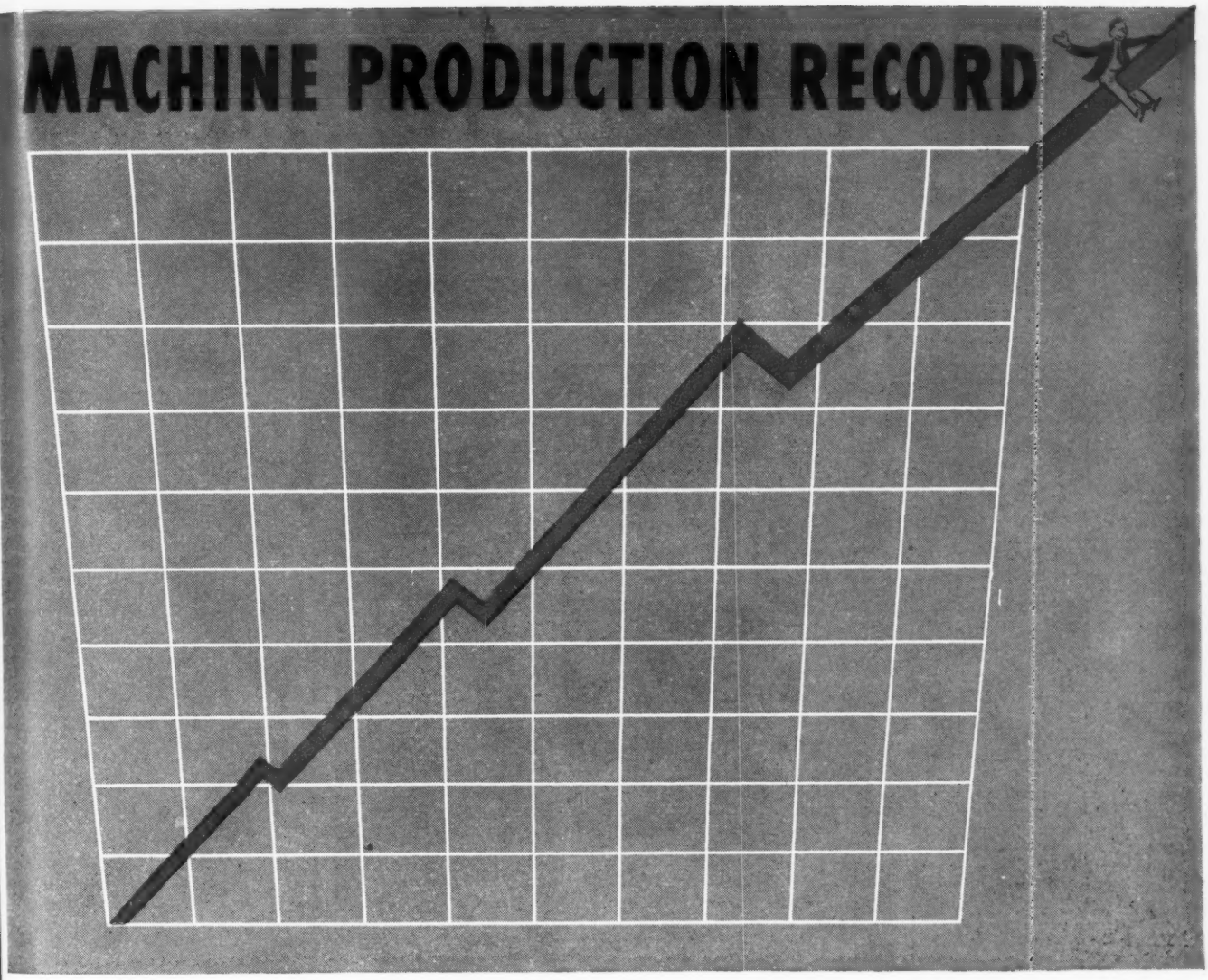

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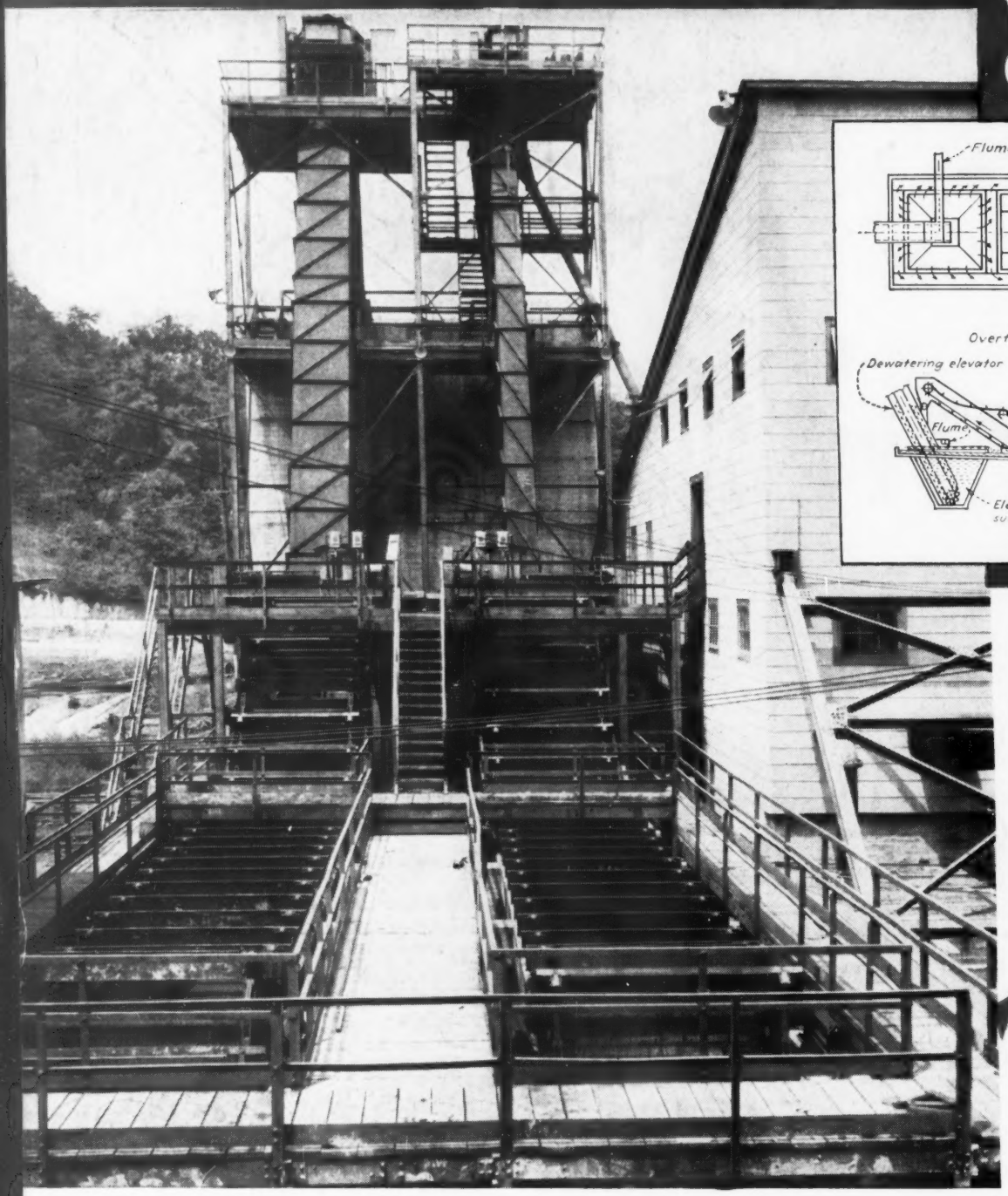
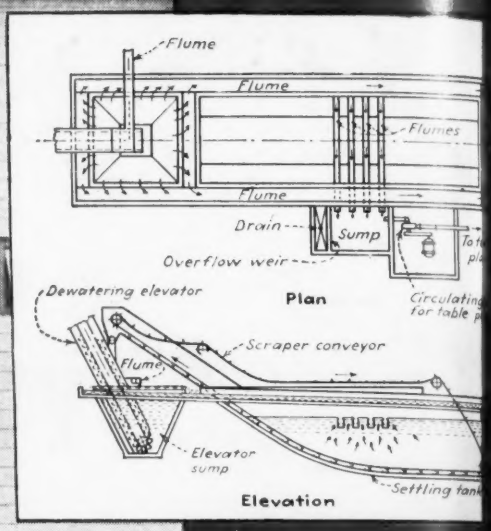
Settling and Dewatering of Fine Washed Coal





Above: Arrangement sump, settling tank and watering elevator to loa bin for metallurgical coal. the left is a photograph this unit and a similar rangement for middlings the underflow water f the washed coal dewate screens.

How Solids are Recovered and Water Clarified for Re-u

● Clean coal from the concentrating tables at Alabama By-Products Corp's new Link-Belt preparation plant is flumed to a sump, shown in the diagram above. Here the coarser solids, settle out in the buckets of the dewatering elevator. This elevator removes most of the coal with the exception of the extreme fines which overflow the sump and are introduced into the back end of the settling tank.

A scraper type conveyor drags the settled fines up an incline of the settling tank and delivers them to the dewatering elevator, above the water line of the sump. In this manner, the coarser solids form a filtering mat which retains the fines in the buckets during the elevating period to the metallurgical coal bin.

This method provides two-stage settling with a high recovery of clean coal of low moisture content and water for re-use which is consistently low in solids.

The second tank and sump with elevator, shown in the photo above, handles the underflow water from the washed-coal dewatering screen and the middlings from the table plant, in a similar manner, with this material being elevated to the middlings bin.

Let us send you more information about this and other innovations in methods and equipment at this modern plant.

LINK-BELT COMPANY

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9742

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